NEW ZEALAND
JOURNAL OF
Agriculture

MAY - 1950

FARMERS!

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Phosphate
Reserves

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HELP DELIVERIES BY
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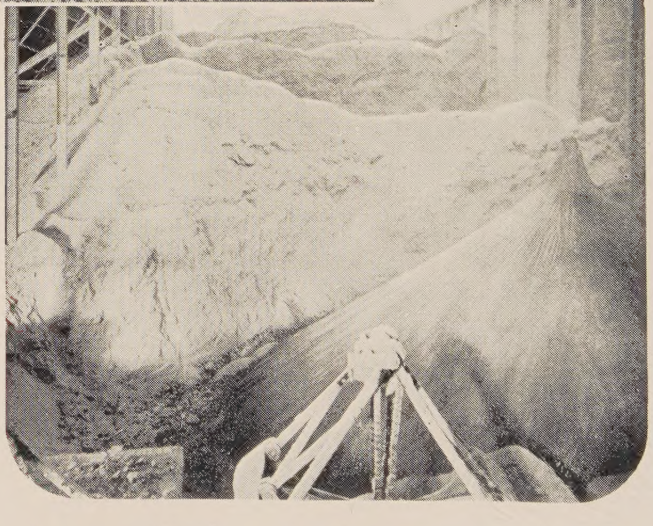
THROUGHOUT THE YEAR



Large Stocks of Matured Fertiliser

THE NORTH ISLAND SUPERPHOSPHATE MANUFACTURERS

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This month's cover

To the east of the Southern Alps are large areas of mountainous tussock grassland on which Merino or half-bred sheep are carried at the rate of about 1 sheep to 4 acres. Although cast-for-age ewes and wethers are sold occasionally, the main revenue from this specialised sheep farming comes from wool. Only relatively small areas of accessible country are available for cultivation and much of it is at an elevation of about 2000ft. above sea level. This month's cover, which was painted by L. C. Mitchell from a photograph by National Publicity Studios, shows easy country on Grasmere Station, near Cass, being ploughed. In the background is Mt. Misery, a peak in the Black Range.

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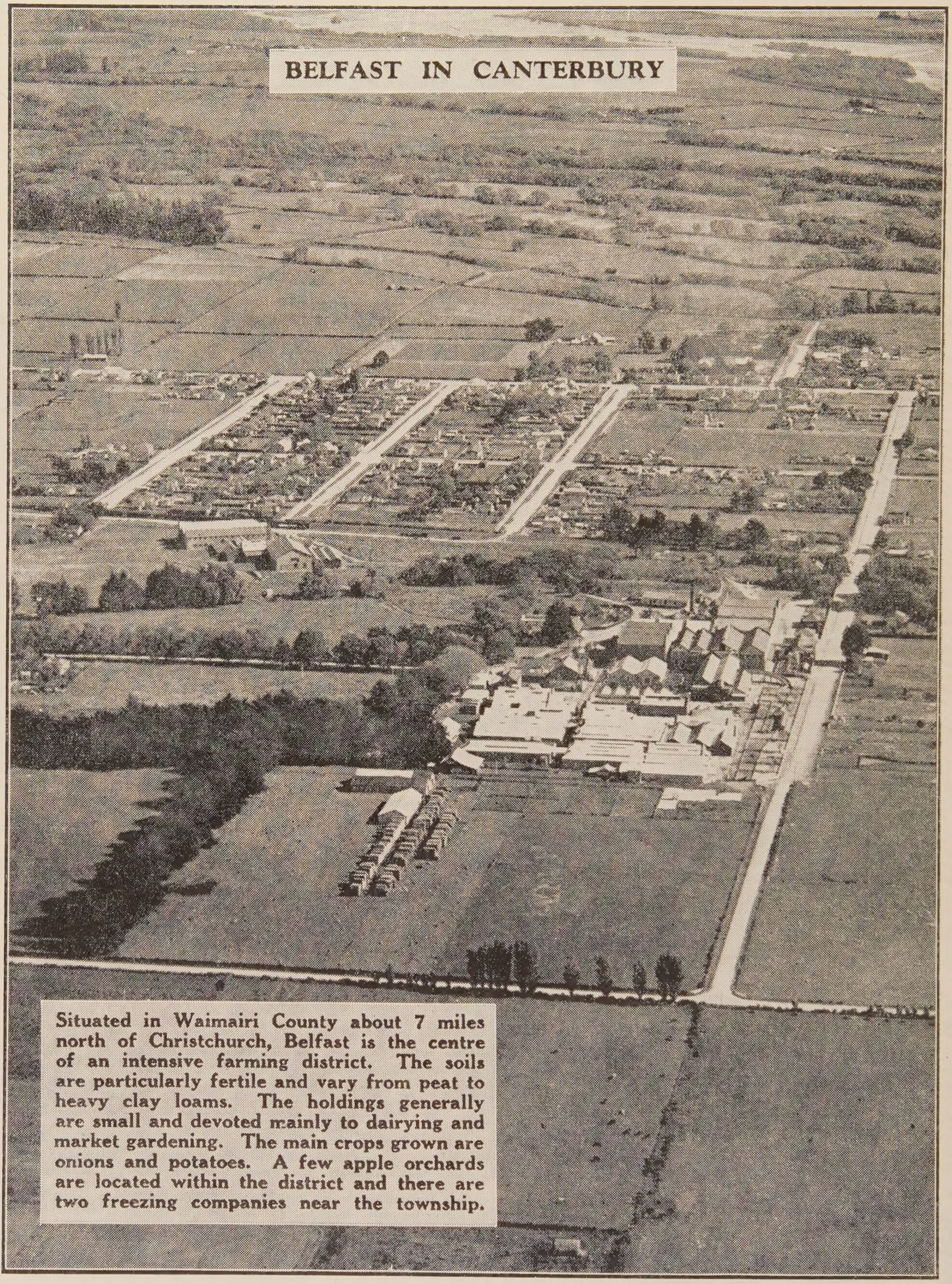
BELFAST IN CANTERBURY



Situated in Waimairi County about 7 miles north of Christchurch, Belfast is the centre of an intensive farming district. The soils are particularly fertile and vary from peat to heavy clay loams. The holdings generally are small and devoted mainly to dairying and market gardening. The main crops grown are onions and potatoes. A few apple orchards are located within the district and there are two freezing companies near the township.

[V. O. Browne photo.

STANDING ADVISORY COMMITTEE ON PRODUCTION

THE Government's decision which I announced about a month ago to establish a standing advisory committee to examine all factors associated with increasing this country's production is a most progressive one, and will, I believe, be productive of results which will completely justify the feeling of confidence with which I left the meeting of representatives of producer organisations to whom I had put certain proposals.

The meeting called in April arose out of the pledge given before the Government assumed office that the production of foodstuffs in this country and their export to the United Kingdom would be increased to the utmost. I was very gratified with the reception of my proposals. The report since submitted to the parent committee by the technical committee which is to aid it strengthens my conviction that an enthusiasm and unity of purpose have been achieved at the outset.

Harmony of Effort

If this purposeful spirit is carried back through representatives on the committee to producers themselves, I feel we will be approaching a new era in harmony of effort by the agricultural community and producer and State organisations that serve it.

I have always been convinced that this country's productive potential is very far from being realised, and I approach my duties as chairman of this new committee with a full sense of the possibilities of achievement which lie in the proper application of the resources of knowledge and experience on which we may draw. With the Director-General of Agriculture as deputy chairman and all the technical knowledge and skill of producer organisations and State Departments at our disposal, there is little possibility of overlooking any considerable potentiality for increased production.

In any agricultural country there are only two ways by which production may be increased. Either greater areas of land must be brought into use, or volume of production per acre of land already in use must be increased.

Most New Zealanders, even those in the towns, are familiar with the term marginal land, and in times of receding prices some farmers have had bitter experience of the reality. There may yet be undreamed of potentialities in some of our land now considered uneconomic for farming, but with our present knowledge there is a fairly strictly circumscribed proportion of the country that may be depended on to contribute to an increased production drive.

This, however, does not justify a lament that there are no new agricultural worlds to conquer. There has been no significant increase in the area of land in use or in occupation in this country in the last 30 years. Previous to this, increases in our production during the era of "extensive" farming were closely related to the areas brought under the axe and the firestick and sown to pasture or brought under the plough. When the area occupied stabilised, the era of "intensive" farming began. This is the era in which we still operate and in which I am confident that the increases in production which have characterised the past 30 years will not only continue but I hope achieve new heights.

It is inevitable that there should be some regret for the passing of the brave days of the ever-advancing agricultural frontier, and it would be foolhardy for us as an agricultural nation to bury the lessons that we then learned. The achievement of some of the aims of the committee that has been established, however, will entail the winning of victories no less important than those of our early farming history, though as many of them may be won in the laboratory and on the experimental farm as in the backblocks. The work of the committee will be closely correlated with those State Departments and producer organisations investigating better production methods and services to farmers, to the benefit of production and our national economy.

Effect of Wartime Shortages

A very real service may also be performed by the committee in a practical approach to the problem of some of the material handicaps to our farming effort. Some of these are the result of prolonged wartime shortages of labour and materials, and rural housing will be a major problem for early attention. The incidence of taxation on certain aspects of farming development, the high cost of fertiliser, transport by sea and land, the effect on production from back country of the remission of subsidies on fertiliser, and the possible use of funds in the meat and dairy accounts for reduction of the cost of essentials such as fertiliser and lime are questions on which the Government will rely on the committee for advice. Some long-term factors in increasing production might require legislation.

The Government is determined to give the committee every opportunity to function to the maximum of its capacity, and will implement as speedily as possible any measure recommended which is practicable and which will effect more production and more agreeable conditions for those engaged in agriculture.

K. J. HOLYOAKE, Minister of Agriculture.

CARE OF LIVESTOCK DURING JUNE

Contributed by Animal Research Division.

WINTER FEEDING OF DAIRY COWS

EXPERIMENTS have shown that cows fed well during winter will produce from 26 to 63lb. more butterfat in the following lactation than those which have been poorly fed during winter. These results were obtained when both groups were well fed after calving. It is therefore very important to feed the cows well from now until calving. If plenty of autumn-saved pasture is available, there is no better winter feed, but the primary purpose of this feed is the good nutrition of early calvers in July, August, and September. Therefore it should not be used now if that will mean a shortage in those months. If autumn-saved pasture is used, cows should graze it for about 1 hour per day and in addition should receive 20lb. of silage and 4 to 6lb. of hay. If autumn-saved pasture is not available, cows should be fed as much hay as they will eat, certainly not less than 10lb., in addition to 20lb. of silage. If the winter is mild and good grazing is available, silage may be omitted, but ample hay should still be provided.

* * *

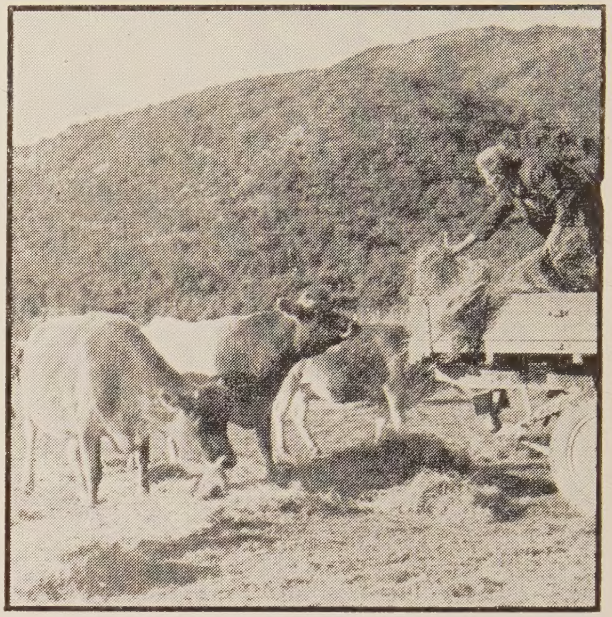
CARE OF SOWS

Sows and any wintered pigs should be fed on roots plus ½lb. to 1lb. of meat meal per day. Pigs should be kept out of the paddocks when the winter is wet, as pugging of pasture at this time of the year will ruin it for spring and summer feeding. Sows due to farrow should be stied and fed what milk is available. After farrowing they should receive up to 5lb. of meal per day plus milk plus roots. Undue economy with meal at this stage will mean light litters at weaning.

* * *

RICKETS IN LAMBS

Lambs in Canterbury and some other South Island districts frequently suffer from rickets when wintered on green oats or barley, and occasionally this trouble is experienced on other types of greenfeed. It can be prevented by giving one dose of vitamin D at the start of winter. The best preparation is calciferol and the dose is 25 mg. dissolved in the smallest amount of olive oil which can be given conveniently with the drenching apparatus available. Even when rickets does not occur this treatment induces much better growth in lambs during winter. Further details and valuable advice on winter feeding of hoggets in Canterbury will be found in an article in the December, 1946, issue of the "Journal."



[*National Publicity Studios photo.*

LIVER FLUKE IN SHEEP

In areas where sheep become infested with liver fluke drenching should be done now. The only effective drug is carbon tetrachloride which should be mixed with 4 times its volume of liquid paraffin. The dose of the mixture is 5 c.c. for sheep of all ages and 1 gallon is enough for about 900 sheep. If only one treatment is to be given, the middle of June is the best time, but if sheep are already showing symptoms, a drench should be given immediately and repeated at the end of July.

* * *

WORMS IN LAMBS AND CALVES

Worms are sometimes still troublesome in May and June and if lambs or calves are not doing well they should be drenched with phenothiazine at the full dosage rates recommended by the manufacturers. Further information about worms and drenching will be found in Bulletin No. 171, "Internal Parasites of Sheep," and Bulletin No. 189, "Control of Internal Parasites by Phenothiazine," which are available from all offices of the Department of Agriculture.

* * *

LICE ON POULTRY

Poultry lice can cause considerable loss of condition and reduced egg laying. To control these parasites a fine trickle of 40 per cent. nicotine sulphate should be run along the perches on a calm night before the birds go to roost. Two or three treatments should be given at weekly intervals.

History of New Zealand Milking Shorthorns

IN attempting to record the history of New Zealand Milking Shorthorn cattle it has to be remembered that this breed was developed locally and is, in fact, the only breed of cattle peculiar to New Zealand. But for the fact that in the later stages of development Australian Illawarra Shorthorn sires were used, New Zealand Milking Shorthorns would have been eligible for entry in the Herd Book of the Shorthorn Society of Great Britain and Ireland (commonly known as Coates' Herd Book), as the breed was founded on the original nondescript cattle that were introduced in the early days of the Colony, graded up by the dual-purpose Bates strain of Coates' Herd Book Shorthorns. This article is the first of three by J. M. Ranstead, of Matangi, which will trace the development of the New Zealand Milking Shorthorn breed.

CONSIDERING the origin of the nondescript cattle mentioned above, what is true of Canterbury may well apply to the rest of New Zealand. In the introduction to volume 1 of the Canterbury Herd Book, published in 1873 by the Canterbury Agricultural and Pastoral Association, it is stated that: "Altogether, according to the Customs returns, about 4,000 cattle were landed in Canterbury between 1850 and 1870, inclusive. Of these about 3,600 came from New South Wales, 200 from Victoria, 20 from Tasmania, and 160 from Norfolk Island. Some cattle were imported from the Chatham Islands, but little is known of their history. Some were described as very fine animals—some like Devons—some like Herefords, and some different from the cattle usually seen in British possessions and believed to be descended from cattle brought in whale ships from South America."

It has been said also of these early cattle: "The original cattle came from Australia, but unlike our sheep they make no pretensions to be of any particular breed. Shorthorns, Longhorns, no-horns, a dozen varieties are so crossed and mixed that Youatt himself would scarcely distinguish the predominant strain" (1).

Marsden and Colenso

Referring to the "no-horns" mentioned, it is of interest to note that the Rev. Samuel Marsden's herd in New South Wales, supposed to have been one of the "finest and least unmixed" (sic) in the Colony, was of the "Suffolk or polled breed" (2). Marsden is credited with introducing the first cattle to New Zealand, to the Mission Station at the Bay of Islands. When Colenso left that station to found one at Ahuriri, Hawkes Bay, he took five head of cattle with him. "While preparations were being made to land the cattle on the beach, a high dispute arose among the natives who had climbed on board to welcome the missionary, the subject of the dispute being as to whether a red poley was a cow or a horse" (3).

The first need of the early settlers was milk and meat, then bullocks for timber haulage, ploughing, and transport. The plough that turned the first furrow in New Zealand at Kerikeri was drawn by bullocks and, even over 40 years later, Colonel Whitmore "took his English bride to her new home bumping along the river bed in a bullock wagon" (3).

Whitmore's Importations

Major-General Sir George Whitmore, as he later became, who came to New Zealand in 1861 as secretary to General Sir Duncan Cameron, who was in charge of the Imperial forces, imported purebred Shorthorn cattle. Rissington Station was a huge block of land taken as a Crown Grant by Sir George in 1861, his boundaries finally extending over much of the Puketiri, Rissington, and Puketapu country, almost the whole area between the Kaweka Range and the inner harbour at Napier (approximately 60,000 acres). The Hawkes Bay sheep returns, as on May 1, 1872, gave the number of sheep on Rissington as 28,500. The following extracts of letters from Whitmore to his manager, McNeill, are of interest:—

In April, 1861, he mentions sending "hayseed"; then, "I have also sent a few rabbits, but I doubt their reaching you, as we have just had a great mortality amongst them." In another letter Whitmore upbraids him for letting loose a crate of rabbits near the homestead "where they will eat the garden greens" when Whitmore wanted them at the back of the station. The letter continued to say that he had not had "game from England, but 4 hen and 5 cock pheasants and 9 quail in the aviary . . . doing well." On September 12, 1861, Whitmore writes: "I have sent you some bees . . . I have also ordered some furze [gorse] plants, they are common and easily got, but to save time I had 5,000 gathered. I am told that they make a capital fence if you can give them the commonest ti-tree sort of fencing to prevent their being broken down by cattle and sheep." A letter of January, 1862, makes reference to killing wild cats—1s. per skin to be given—and hawks; also to the acquiring of some of the Emperor's French Merinos (3).

The purebred Shorthorn cattle imported by Whitmore were General Havelock, a bull bred by Mr. Jonas Webb, Babraham, Cambridge, and a cow, Duchess of Walton, bred by Mr. Edward Bowly, Siddington, Cheshire. According to Sinclair (4) Webb was one of the most able and successful breeders of his time. After his death in 1862, when his herd was sold, 18 of

Mature cow Milking Shorthorn class at a recent New Zealand Royal Show.

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1. Holford, G. H. (1927): "The Acclimatisation of Stock in Canterbury," page 277 of "Natural History of Canterbury."

2. McCaffrey, Frank (1922): "The History of Illawarra and its Pioneers," page 157.

3. Wilson, T. G., and others (1939): "History of Hawke's Bay."

4. Sinclair, James (1907): "The History of Shorthorn Cattle," page 251.

the animals were bought for export to Austria and Prussia and several for Australia. Bowly was widely known as a member of the council of the Royal Agricultural Society of England and through his great success as a breeder of Shorthorns. Referring to Duchess of Walton's sire (Earl of Walton, a bull bred by Bates of Kirklevington) Bowly said: "His produce were very good, indeed I think I have never had better animals than he got" (4a).

Early History of Breed

The development of the Shorthorn breed of cattle (known as Durhams in some parts of the world) had been going on steadily for more than 100 years before the Coates' Herd Book was first issued in 1822. The early history of Shorthorns is based on somewhat uncertain data, because, until George Coates published the first volume of the herd book, written records were practically unknown. It is said that the Earls and Dukes of Northumberland had been breeding short-horned cattle for 200 years before 1780, when the Colling brothers first came to the fore. One fact at any rate is certain: There existed in the valley of the Tees, around Darlington, a breed of cattle known as Teeswaters, whose characteristics were large frames, strong bone, a capacity to attain great weight at 5 or 6 years, and a heavy milk yield. This was the foundation stock when Charles and Robert Colling built up the Improved Shorthorn. In his "History of Shorthorn Cattle" Sinclair says of the Colling brothers:—

> Not many well-informed persons in these days would deny them right to rank as foremost improvers of the breed. It may be true or untrue that they found Shorthorns as good as any they bred; but suppose they never bred beyond the highest merit previously reached, yet did not the Shorthorn breed, in their hands, become a power unknown before? Did not the Collings find a scattered few good animals, loosely bred, and of dubious type, and leave a breed distinct in character, and of marvellously great breeding influence?

Record Price for Sire

The results achieved by the Collings were due to inbreeding and culling, thus concentrating and fixing the good qualities of outstanding individuals.

When Charles Colling's herd was sold in 1810 the crowning event of the day was the sale of the bull Comet 155, the first bull ever sold for £1000. This bull was so strongly inbred that he is quoted to this day as an example of successful inbreeding.

At this sale were two purchasers whose names afterward figured largely in the Shorthorn world: Thomas Bates and Thomas Booth. Bates bought the 2-year-old heifer Duchess 1st, by Comet 155, the foundation of the famous Duchess tribe. Ketton 1st was full brother to the dam of Duchess 1st; Duchess 2nd and Duchess 3rd were by Ketton 1st out of Duchess 1st. From this foundation, with practically no infusion of other blood, Bates bred more than 100 animals, practically all of which were excellent individuals in themselves and had the power to transmit their qualities to their offspring.

Demand for Bates Stock

In 1850 Bates's herd was sold, there being no relative available to carry on its founder's work. Held at a time of severe agricultural depression, the sale is not a fair criterion of the excellence of the stock. The following table shows the remarkable value subsequently set upon animals of pure Bates blood (5):—

Sale	Stock	Prices
Kirklevington (Bates) 1850	Duchesses, Oxfords, Waterloos, Wild Eyes, Foggathorpes—68	Average, £67; total, £4,558
Earl Ducie's, 1853	Stock bought at above sale	Cost £991; realised £5,345
Mr. Hegan's, 1865 (in Willis's Rooms), 1871	17 Duchesses	Average, £481
Duke of Devonshire's, 1872	3 Oxford cows	Average, £885
Earl of Dunmore's	4 Oxford cows	Average, £910
New York Mills, U.S.A., 1873	109 head of Bates cattle	General average, £734. Average for 15 Duchesses and Dukes, £3,749
Earl of Dunmore's, 1875	39 head	Average, £672
	Duke of Connaught (bull)	£4,500

Commenting on the above demand for Bates blood in his "50 Years Among Shorthorns" (1907) Robert Bruce says:—

> From the time the Kirklevington herd was sold in 1850, when Earl Ducie took six head of the highest priced cattle to Tortworth, the breeding of Bates cattle became a fashionable pastime of men of wealth and position, backed up as they were by American opinion founded on the principle of "Corner and Boom." We find that at the sale at Tortworth in 1853, American buyers, with the view of getting possession of the Kirklevington cattle and their produce, ran prices to a very high level, and secured the majority of the animals. The high prices at Tortworth naturally drew attention to the breed generally, and the Kirklevington blood in particular. Noblemen and gentlemen vied with each other in gaining possession of descendants of the Kirklevington herd, and for nearly thirty years sales went merrily wherever animals of this blood were exposed for sale. Animals came to be sold for hundreds and thousands, and, as can easily be understood, anything in the shape of weeding out of inferior animals was in too many cases neglected. Pedigree was considered of infinitely more importance than individual merit. . . . . There cannot be a question but that, as a rule, Bates cattle were good milkers. During the time Mr. Thomas Bates owned them great attention was given to the dairy production of his herd, and even down to the present day, cattle with a strong dash of this strain of blood are in favour as dairy animals. . . . There is no need to follow the fortune of Bates cattle during the time of extreme prices —prices that unquestionably brought about the loss of much that was valuable in Kirklevington stock. . . . To go into the matter would seem to answer no good purpose; the charm has now long since been broken, and every one who has the interests of the breed at heart must acknowledge that tradings and dealings, in paper pedigree records, were detrimental to the best interests of the breed.

Thomas Booth

Thomas Booth differed from Bates in that he did not go to the Colling brothers for females. He purchased bulls from the Collings and crossed them on the best cows he could find in the district, choosing them for their constitution and aptitude to fatten. The type he aimed at was: " . . . great wealth of flesh, a broad deep frame of moderate size on short legs." Booth and his sons were Bates's great rivals and for many years Shorthorns were spoken of as belonging to two strains of blood: Bates and Booth. A summing up of the work of these rivals was that they bred "Booth for the butcher, Bates for the pail." During the time of extreme high prices few Bates cattle found their way into the north of Scotland, but an analysis of any one of Cruickshank's pedigrees will show the great influence Booth animals must have had in the production of the now fashionable Scotch Shorthorns.

To quote again from "50 Years Among Shorthorns":—

> With regard to the Cruickshank strain of blood it may be stated that the late Mr. Amos Cruickshank, a tenant farmer himself, aimed to breed rent-paying stock. The great attention which he gave to maintain the constitution by developing lean flesh in his cattle rendered the animals peculiarly suited to improve the gayer looking but less substantial Southern Shorthorns. Considerable feeling existed, and in fact still exists, on the part of breeders regarding the want of what is spoken of as "style and character" in many of the North of Scotland cattle, and there can be no question but that many thrifty good specimens of Northern cattle lack the carriage and style looked for in high-class animals. . . . No one taking a dispassionate view of the whole subject connected with the state of matters in the Shorthorn world towards the end of the past century can question the statement that Amos Cruickshank, of Sittyton, practically saved the situation at a time when the outlook for the future of the breed seemed anything but bright. A mistaken estimate of the value of what has been called paper pedigrees had held the field for about a quarter of a century, and utility had to a great extent been lost sight of. In the once famous Bates and Booth herds matters were far from satisfactory. In the United States the Bates craze had been carried to such a length as to work infinite damage to the whole cattle population of that great country. During several visits paid to America in the eighth decade of the past century, I found a strong reaction had set in with regard to the use of Bates bulls. For a considerable number of years previous, no herd was considered of much account unless it was headed by a Duke bull, and many of the specimens of this family I saw being used on account of their being what was termed straight-bred were qualified to beget weeds in the full sense of the term. I was present at the sale of a herd of cattle described as **absolutely pure Bates**, and can confidently assert that in the large number offered, there was not a single cow or heifer in the lot that would have made ten pounds had she been offered for sale in any open market in England. The sale was a most disappointing one to the exposer, although the cattle made much more than their intrinsic values, owing to a few of the purchasers holding a belief in what they termed "blood," and seemingly unable to realise that the pedigree craze was fast dying out, if, indeed, it had not even then been dead and buried.

4a. Sinclair, James (1907): "The History of Shorthorn Cattle," page 242.

5. "Shorthorn Breeders' Guide" (1923), page 16.

[From "The Government Insurance Recorder" (1911).

Waikato herds were predominantly grade Shorthorn and the best of these grade Shorthorn cows could hardly be excelled today.

New Zealand Herd Book

That this boom and slump in pedigree Shorthorns were reflected in New Zealand will be seen later when reference is made to the issuing of only one export certificate to New Zealand by the Shorthorn Society of Great Britain and Ireland during the years 1882-1899, the delay in the publication of volume 2 of the new series of the Canterbury Herd Book in 1893 (volume 1 appeared in 1884), and about 1885 the disappearance without trace of the New Zealand Stud and Pedigree Stock Company of Auckland.

There had been importations of purebred Shorthorns, mainly from Australia, quite early in the history of New Zealand. There was no herd book in Australia and it seemed satisfactory enough then to say that they were bred by so and so from imported cattle. By this time it was impossible to trace the pedigrees of these cattle and in consequence their offspring were not eligible for Coates' Herd Book.

Whitmore's importations were valuable animals, imported while the Shorthorn boom was at its height, whose value largely lay in their pedigrees, and the same applied to many other Shorthorns imported about this time. It seems probable that it was in order to maintain the value of the offspring of these imported cattle, by furnishing reliable pedigrees, that it was decided to start a New Zealand Shorthorn herd book.

The first volume appeared about 1866 and contained pedigrees of 27 males and 18 females, of which 14 males and 11 females were imported from England. Most of the owners of these imported cattle were located in the North Island: Sir George Whitmore, Messrs. Carlyon, Canning, and Ormond, Ford and McHardy, Nairn, and the Rev. S. Williams at Napier; and Archdeacon Hadfield at Otaki. The South Island was represented by Messrs. W. U. Slack and Caverhill, of Canterbury, and the Hon. M. Holmes, of Southland.

Volumes 2 and 3 of the herd book appeared by 1870, the first three volumes being published by Sir George Whitmore. Then the publication was taken over by Mr. W. J. G. Bluett, of Holcombe, Leeston, Canterbury. Mr. Bluett edited volume 4 and published it at his own risk in 1875, charging 2s. 6d. for each entry and half a guinea for the herd book. When he published volume 5 in 1877 he said: "By the last volume, independently of the time it took me to prepare, I was largely out of pocket. Now, I am quite willing to carry on the work as a labour of love, but I cannot afford to lose money by it. As long as the work pays its own expenses, I am satisfied. I do not think, therefore, that anyone interested in purebred stock will object to the increased price of the present volume, namely, one guinea." Owing to lack of support, probably due to the depression which started in the late seventies, no further volumes were published.

Earliest Pedigrees Recorded

The earliest pedigrees recorded are those of Duchess, roan, imported by Mr. Greenwood in 1848, and Duke, roan, calved 1848, imported by Mr. Greenwood in 1849, both animals being the property of Mr. J. S. Caverhill.

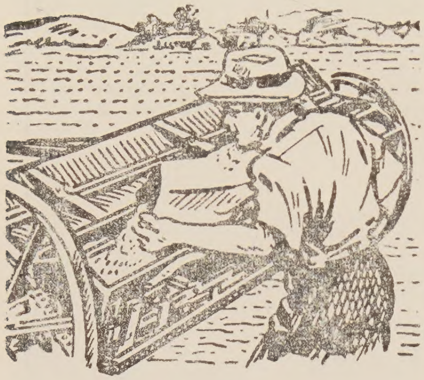
Mr. John Scott Caverhill had gone to Australia from Scotland about 1830 and there gained high repute as a livestock breeder, judge, and drover. He came to New Zealand in the early forties and pioneered Cheviot in North Canterbury. Subsequently he leased Motunau and owned Hawkeswood, Mendip Hills, and Highfield. Caverhill, like many another of the hardy pioneers who did so much to break in new country, died a poor man; his descendants, a road, and a trig station at Cheviot perpetuate his name (6).

The modern beef Shorthorn had not been developed; the Shorthorn of that day, especially of the Bates strain, was regarded as a good milker. Two at least of the bulls in the first volume of the New Zealand Shorthorn Herd Book, Knight Templar and Knight of the Bath, imported by Mr. C. Nairn, came from a dairy herd, their breeder, Mr. S. Rich, Didmarton, whose herd was kept as a dairy, milking up to 100 cows (4b). It was at the dispersal of the Didmarton herd in 1868 that Shorthorn breeding may be said to have begun as a fashionable pursuit. The high prices realised at this sale gave an impetus to Shorthorn breeding all over the United Kingdom. The boom thus started ran on till 1875, when it culminated at Mr. W. Torr's

First general meeting of New Zealand Milking Shorthorn Association, held at Palmerston North, June, 1914. Standing, from left—W. Hunter, secretary, A. Turnbull, J. R. Anderson, J. Hearsey. Standing, from right—T. Hinton, J. Drysdale, J. Hodges. Sitting, from left—T. H. Windley, ———, J. Grant, E. Law, J. C. Wright, ———.

4b. Sinclair, James (1907): "The History of Shorthorn Cattle," page 248.

6. King, B. E. (1947): "The New Zealand Journal of Agriculture," volume 74, page 244.



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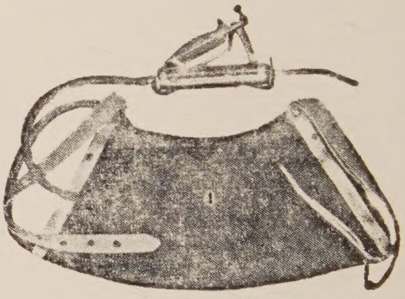

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great sale of Booth blood, but gradually declined with the disastrous farming years of 1878-79. At Mr. Torr's sale 84 head realised £43,000, averaging more than £510. It was here that Mr. J. Marshall bought the bull Riby Knight for 710 guineas to bring to New Zealand (4c).

While the Hawkes Bay importations were mainly of Bates blood, the Hon. M. Hume, Southland, imported two Cruickshank bulls, Florentine and Master of the Mint. The Cruickshank cattle of that day, however, were not the specialised beef breed that they afterward became.

Canterbury Herd Book

In 1870 the Canterbury Agricultural and Pastoral Association established the Canterbury Herd Book. As explained in their circular the object primarily was, besides recording pure pedigrees, to preserve all that was known of a great many good cattle which had been brought to Canterbury, without pedigrees, from different parts of the world. Although the intention was to have a Shorthorn Herd Book, it was deemed advisable in the first instance to admit entries of other breeds. In the preface to the first volume it was stated:—

> Mr. Reece's Devons are entered; and the mode of treating these entries hereafter must be determined by the course which events may take. If, on the one hand, the breed remains pure, and a sufficient number of breeders are found to take an interest in Devon cattle, the entries will be eliminated from the Herd Book and transferred to a separate one. On the other hand, should the breed become mixed up with, and absorbed by, the more numerous Shorthorns, it will be interesting for breeders, years hence, to trace the point where the Devon strain comes in, and to note its effects.

Therefore in the first volume of the Canterbury Herd Book there were many entries with imperfect pedigrees or none. Among these were three cows, Flash, Cream, and Duchess, imported by Dr. Moore, of Charteris Bay, Banks Peninsula, in 1851. Duchess had a bull calf, Cranberry, calved soon after (or before) she landed, from whom some of the best Canterbury Shorthorns are descended. No authentic information about the pedigrees of Dr. Moore's entries was obtainable at the time, but a full pedigree of Flash was found and published in volume 14 of the New Zealand Shorthorn Herd Book (new series) nearly 50 years later.

When volume 2 of the Canterbury Herd Book appeared in 1872 it contained the following note:—

> With regard to future entries, the Association has passed an important resolution, the strict adherence to which will add greater value to Canterbury pedigrees, as a standard has been adopted below which entries will not be received. The resolution was passed on 6th August, 1872, and is to this effect:—
>
> > That after 1st January, 1873, no entries will be received unless of Cattle whose sires and dams are entered in Coates', The New Zealand, Canterbury, or some other recognised Herd Book, except in the case of any animal taking Three First Prizes at the Canterbury Agricultural Association's Exhibitions, which may be entered, subject to the approval of the Committee of the Association.

The Canterbury Herd Book ran into 5 volumes, the last being published in 1880. Mr. Bluett had published the fifth volume of the New Zealand Herd Book in 1877, but owing to lack of support had not been able to publish another volume. As the conditions of entry of the Canterbury Herd Book had been tightened up and were now the same as those of the New Zealand Herd Book, it seemed unnecessary to run two herd books. Arrangements were made with Mr. Bluett to take over the publication of the New Zealand Herd Book, and in 1884 the Canterbury Agricultural and Pastoral Association published the first volume of the New Zealand Shorthorn Herd Book (new series).

The 1922-23 council of the New Zealand Milking Shorthorn Association. Sitting, from left—J. C. Wright, S. Morgan, J. Parkinson, D. Buick, J. Grant. Middle row—J. Bateman, J. R. Anderson, A. W. Green, W. Hunter, R. V. Brown, A. Vickers. Back row—R. Peach, T. H. Windley, A. Melville, A. Fisher, J. Hodges, J. M. Ranstead, J. Hearsey.

It was not until 1893 that volume 2 (new series) appeared. The editing committee expressed their regret at the long interval (9 years) which had been allowed to elapse since the publication of volume 1. They said:—

> The delay has been entirely due to the apathy of many breeders in sending sufficient entries to warrant the Editing Committee in undertaking the cost of publication. . . . Doubtless the apathy referred to resulted from the long continued depression in the cattle industry. Happily the development of the dairy industry, combined with other causes, has now placed the breeding of stock amongst the profitable investments of the farm.

Dairy Industry Develops

With the introduction of refrigeration in the eighties the dairy industry developed rapidly. At that time the universal dairy cow was an animal that had been graded up from nondescript cattle by the use of dual-purpose Shorthorn bulls. Naturally some of these cows verged too much toward the beef type and were poor milkers, but as all cows were hand milked a poor milker was easily detected and culled. The trouble was, however, that this culling was an annual event; out of every season's heifers too many had to be culled for low production. This could only be expected, as the most important breeders of the Coates' Herd Book stock were farming in a big way and not milking. Their stud cows generally suckled their calves and only a few were milked for household purposes. There were, of course, a few stud herds treated as dairies, but these were usually headed by a fashionably bred beef bull and no records of production were kept. Under these circumstances many dairymen preferred to use an unregistered bull, preferably out of one of their best cows. Others gave up in disgust and used a bull from one of the special-purpose dairy herds.

Government Importations

It was at this stage that the New Zealand Government decided to import some Shorthorns of a definite dairy strain. In the annual report of the Department of Agriculture, 1901, it was stated:—

> To give settlers an opportunity of securing fresh blood, Mr. Gilruth has been authorised to purchase in Great Britain 8 Shorthorn bulls and 4 Shorthorn cows. The bulls will be placed at suitable centres and will be available for service to approved cows at a reasonable fee.

Then followed Mr. Gilruth's report on the purchase of purebred cattle in Great Britain. It read as follows:—

> Although in a large cattle-breeding country like Great Britain it seems a simple matter to purchase twelve Shorthorn cattle, yet I found it no easy matter to ascertain to whom I should apply for Shorthorns of milking strain. In the first place, the Shorthorn is essentially a beef animal, and one that for many years has been improved by selection solely, or almost so, from that point of view. Seeing that this is the type of animal that commands the highest price it would be surprising were it otherwise. In fact to such a pitch has this breeding been brought that milking capacity, in many herds, is so nearly eliminated that for a calf the milk of a crossbred cow is considered necessary, together with artificial feeding along with the mother's milk.

4c. Sinclair, James (1907): "The History of Shorthorn Cattle," page 226

From the Shorthorn Society and the British Dairy Farmers' Society, I obtained a few names of breeders who paid more or less attention to milk in their herds. Mr. Samuel Lowe, the energetic head of the dairy produce branch of Messrs. Waddel and Co., came to me in my difficulty and introduced me to Messrs. John Thornton and Co., the famous Shorthorn salesmen and agents. Knowing every breeder of Shorthorn cattle in Great Britain, they promptly supplied me with the names of breeders who were most likely to have the class of animal required. Fortunately about this time I met Mr. R. P. Cooper, M.R.C.V.S., of Shenstone Court, Lichfield (and head of the firm of Wm. Cooper and Nephew, of world-wide sheep-dip fame), and explaining to him the difficulty I was experiencing in my quest, he very kindly offered me the services of his estate manager, Mr. Frank Webb. As Mr. Cooper is proprietor of an excellent Shorthorn herd, which Mr. Webb supervises, and knowing that Mr. Webb had previously bought a number of Shorthorns for the Russian Government, I naturally jumped at this generous offer.

Messrs. Thornton arranged an itinerary from the north to the south of England, and for part of the way one of the partners, Mr. Jonas Webb, accompanied us. On the completion of this journey we had bought, subject to the tuberculin test, nine bulls and four cows. As I could not test the animals at the time of buying without unduly trespassing on Mr. Frank Webb's time, I arranged with two of the veterinarians I had engaged to test the animals. My disgust may be imagined when, out of the number, only three bulls did not react. Not only was the time that had been spent practically wasted, but the ground available had been almost covered, and there was the possibility of similar results continuing, as indeed, proved to be the case. And this was so to a heartrending extent. Besides the difficulty presented by the reactions, the period of the year, spring, was unfavourable for the purchase of cows. The great majority would have been due to calve during the time occupied by the voyage, which was far from being advisable, and those that had calved had done so so recently as not to be in calf again.

The first shipment was made up of seven bulls and one cow. Two heifers are to be sent from Lord Rothschild's famous Tring herd, and I left the selection of another bull and another cow in the hands of Mr. Webb, the next shipment to be made in July or August.

With the exception of Lord Rothschild's herd, I did not find any complete system of records followed in regard to milk yields in Shorthorns. The majority were kept in a more or less loose manner, the weekly returns being aggregated or an average struck occasionally. On account of this, Mr. Webb and I confined ourselves chiefly to an examination of the bull as a bull, and a careful examination of the dam and grand dam, both of which we saw in nearly every case. The milking capacity we judged by the usual standards. We therefore judged each bull not only by his own points, but by those of his dam and grand dam; and I may state that, so far as butterfat and its extraction by the Babcock test is concerned, I found this considered more in the light of a scientific plaything than as a serious help to breeding. In extenuation, it may be pointed out that the quantity rather than the quality of milk is what is considered of importance in England, seeing that, as a general rule, it pays better to retail milk than to make butter.

The shipment arrived safely and the cattle were distributed between the Weraroa, Moumahaki, and Ruakura Experimental Farms. Besides giving dairymen the use of the imported sires, the Government decided to build up herds of milking strain Coates' Herd Book Shorthorns and further importations were made, 7 bulls about 1905 and a further 3 in 1907. A few New Zealand Coates' Herd Book cattle were bought, but the results were not very satisfactory and progress was slow.

Illawarra Shorthorns

During 1911 Mr. J. Drysdale, manager of the Weraroa Experimental Farm, made a visit to Australia and on his return reported as follows:—

The breed which proved the most interesting to me in Australia was that known as the Illawarra Milking Shorthorn, a dairy type of Shorthorn evolved on the South Coast districts from a Shorthorn-Ayrshire foundation, but now bred for about thirty years to a Shorthorn dairy type. Whatever critics may say of the Illawarra cow, it is certain that she can produce milk, and that she is of a distinct dairy type that has been fixed. One very good point of the Illawarra is that while it is a heavy producer, the milk is generally of a very high butterfat standard. The dairy farmers responsible for her creation are proceeding on sound lines to maintain, and if possible improve, the special breed they have evolved. In the Herd Book Society formed of recent years, performance as well as Illawarra type are laid down as the essentials to registration. A cow must be able to produce under supervision a certain yield of milk, but no matter what the yield, if she cannot pass inspection as the type desired she is not considered to be eligible. When this sound system of advancing dairy type through a herd book has progressed for a decade or so the Illawarra Shorthorn should be without a rival in Australia as utility milking stock. During my investigations in Australia I could only come to one conclusion, taking my own observations, the statements of disinterested parties, and what I could read, and that was that the Illawarra cattle were head and shoulders above the other breeds when the general returns from the herds came to be averaged. There is not the same tailing off as is usual with too many of the other special-purpose breeds—and it is, after all, the average rather than the work of a few exceptional animals which determines the value of a breed. Good as is the work the Illawarra cow is doing in its natural environment, I am convinced that it would show much greater returns under New Zealand conditions.

This report was published in "The New Zealand Journal of Agriculture," May, 1911, and in the same issue appeared the following note:—

The Minister of Agriculture, the Hon. T. Mackenzie, has decided to purchase two bulls of the noted dairy strain of Shorthorns known as the Illawarra or South Coast dairy cattle of New South Wales. These bulls will be located at the Weraroa and Ruakura Experiment Farms, to be used with the dairy Shorthorns now at those centres.

The Government's attempt to establish a stud of Coates' Herd Book Shorthorns seems to have been abandoned about this time, for in the December, 1911, issue of the "Journal" the following statement appeared:—

It has long been desired to develop on milk-record principles a herd of Shorthorns of fixed dairy type at the Weraroa Experimental Farm, but hitherto the endeavour to secure the desired type has failed, while disappointment has attended, except in a few solitary cases, the use of the bulls employed from a dairying viewpoint. A new field has been exploited in the search for blood in which dairy qualities will be dominant. Two bulls and nine heifers have been purchased from the noted milking Shorthorn herd at the Darbalara Estate, in the South Coast district of New South Wales. . . . The two bulls secured for Weraroa were selected because of their undoubted milking ancestry. . . . The nine heifers are said to be typical of the best milking Shorthorn blood in New South Wales.

Results of First Cow Testing

Though Mr. Gilruth found during his visit in 1901 that the Babcock test was not taken seriously by breeders in England, in New Zealand it had been taken as a basis of payment. Even at that time a few progressive dairy farmers were weighing and testing the milk of their individual cows as a basis for herd improvement. The movement gradually spread and later, with the assistance of the Dairy-produce Division of the Department of Agriculture, cow-testing associations were formed, the first at Dalefield, Wairarapa, in 1909. The results of its first year's operations showed that this group of 598 cows, milking 210 days and over, and averaging 260 days, gave an average yield of 7133lb. of milk and 274.57lb. of butterfat. The yield of the best cow was 495.85lb. of fat and that of the poorest, which was milked for only 225 days, 137.05lb. of butterfat. Photographs of groups of cows from the best herds show that these were, without exception, typical non-pedigree Shorthorns (7).

The cow-testing movement soon spread to other districts and it is estimated that within 3 years more than 13,000 cows were being tested by associations then in existence. Besides giving dairymen an opportunity of culling their low producers, cow testing impressed on them the necessity of using bulls from tested dams.

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7. Singleton, W. M. (1910): "The New Zealand Journal of Agriculture," volume 1, page 149.

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Radio Broadcasts

THE following radio talks will be given to farmers from Station 1YA Auckland at 7.15 p.m.:—

June 7—"Aerial Topdressing," by M. M Burns, Director, New Zealand Manufacturers' Research Association, Auckland.

June 14—"A Year on a Bee Farm," by R. S. Walsh, Apiary Instructor, Department of Agriculture, Auckland.

June 21—"Milking-machine Improvements," by J. C. Gerring, Extension Officer, Department of Agriculture, Hamilton.

June 28—"Young Farmers' Clubs," talk arranged by Northern King Country District Committee, New Zealand Federation of Young Farmers' Clubs.

The following talk will be given from Station 1YZ Rotorua at 7.15 p.m.:—

June 8—"Feeding of Stock in Winter," by A. V. Allo, Instructor in Agriculture, Department of Agriculture, Tauranga.

Radio talks will be given to farmers from Station 4YA Dunedin at 7.30 p.m. as follows:—

June 14—"Home-garden Maintenance," by C. K. Ellis, Horticultural Instructor, Department of Agriculture, Dunedin.

June 28—"Foot Troubles in Stock," by I. M. Cairney, Veterinarian, Department of Agriculture, Dunedin.

Other talks are given from 1YA Auckland on Tuesdays at 12.35 p.m., 2YZ Napier on Tuesdays at 7.10 p.m., 2YA Wellington on Thursdays at 12.35 p.m., and 3YA Christchurch on Mondays at 12.20 p.m.

Pig Broadcasts

Under the auspices of District Pig Councils broadcasts will be delivered in June as follows:—

Whangarei—1XN, on June 5 and 7, at 7.30 p.m., "The Carcass Quality Scheme," by J. Wheeler, Supervisor, Northland District Pig Council.

Auckland—1YA, on June 20, at 12.35 p.m., discussion, "Avoiding Losses in Pig Production," conducted by H. E. Clark, Supervisor, Auckland District Pig Council.

Napier—2YZ, on June 14, at 7 p.m., "Crops to Grow for Pigs," by H. T. Donaldson, Supervisor, Tairawhiti District Pig Council.

Palmerston North—2ZA, on June 16, at 7 p.m., "The Carcass Quality Scheme," by L. L. Marsdon, Supervisor, Wellington District Pig Council.

Dunedin and Invercargill—4YA and 4YZ, on June 14, at 7.10 p.m., "Care of Spring Litter after Weaning," by N. Macdonald, Supervisor, Otago and Southland District Pig Council.

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Britain's Efforts to Reach Farming Production Targets

BRITAIN has had to depend greatly on the increased production of Empire countries to help ease her food shortages both during the war and the economic crisis which has followed, but her own farmers, too, have responded splendidly to the appeal made for an expansion of agricultural industry. At no other time in her history has Britain set herself the agricultural production targets which she is now striving to achieve—an increase of 50 per cent. over the pre-war output. Today about 40 per cent. of Britain's food supply is obtained from her own farms, the products from which do not compete with New Zealand's exports of butter, meat, and wool. An outline of the resurgence of farming in Britain in the early years of the war and the development of the expansion programme now in operation is given in this article, which is based on a talk given recently to the New Zealand Association of Scientific Workers by D. S. Hendrie, Agricultural Adviser to the United Kingdom High Commissioner.

THE state of British farming in 1939 was only moderate, and though there were some signs of economic recovery, no one dared to think of doing more than maintaining production on a reasonable level of profitability, and real expansion was not seriously contemplated. The general position was to be expected after a decade of depression following a catastrophic drop in farm values after the First World War. From 1921 onward agricultural workers left the industry at the rate of almost 16,000 a year, very little was done to improve permanent equipment, and the acreage under the plough dwindled to the lowest recorded; in England and Wales it became 5 million less than in 1870.

In Great Britain the acreage of cereals fell in the same period by 47 per cent. "Rough grazings" encroached on "pasture" to the extent of 2 million acres and the proportion of temporary grass fell as the plough retreated. There were, of course, plenty of successful farmers, but the broad picture was one of contraction, except for such livestock products as could be supported by large imports of animal feeding stuffs. It was more than a material contraction; to some extent there was a mental contraction as well, and some of the spirit of adventure and love of the work went out of the industry for a time, at least.

From the beginning of the war until the present time the expansion of agriculture in Britain has had three phases. First, there were 6 production years (from the harvest of 1940 to that of 1945) of intense wartime effort, when there occurred an agricultural metamorphosis probably as significant as the Industrial Revolution of an earlier century. This stage coincided with the nation's fighting effort, and there is no doubt that farmers derived a deep mental satisfaction from playing their appointed part and that the success obtained owed a lot to this factor.

Second, there were 2 years (1946 and 1947) of resting on the oars, when military victory in itself seemed enough. During this lull output fell about 5 per cent. from the 1944-45 peak.

Third, when the economic crisis occurred British farmers almost overnight were committed to a 4-year expansion programme, half of which has now run.

Aim of Programme

The programme is designed to increase the gross output of 1939 by 50 per cent. (or the 1946-47 output, when the campaign was launched, by 20 per cent.) and to enable the United Kingdom to produce about half her total food requirements, compared with 30 per cent. before the war and 40 per cent. at the war peak. More than half the increase is to come from livestock. The following figures (in terms of weight of produce) show the increase desired by 1952, the pre-war output being taken as 100:—

Milk	126
Eggs	131
Beef and veal	110
Mutton and lamb	83
Pig meat	92

Imports of feeding stuffs and bread grains are to be much less than before the war, and the programme is fundamentally based on a much bigger acreage of land under arable crops. The increases (in terms of weight of produce) aimed at by 1952, the pre-war output being taken as 100, are:—

Wheat	162
Barley	209
Potatoes	180
Sugar beet	134

This is where the programme departs from both the traditional agricultural pattern and the inclinations of a large section of the farmers of the country.

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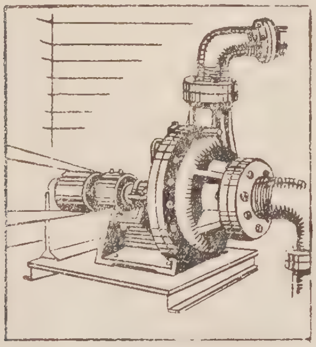

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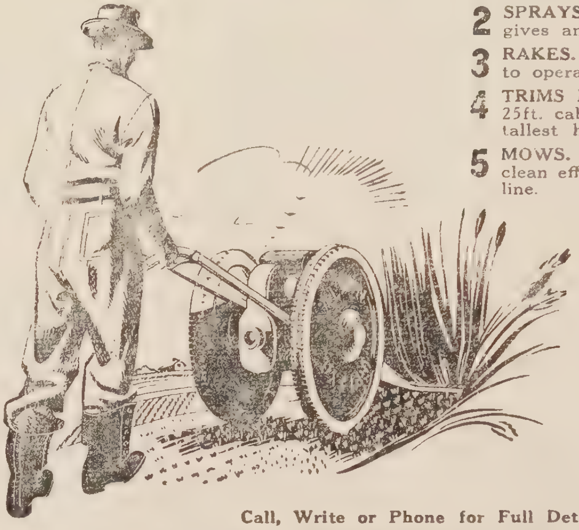

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The plan could be summarised as follows:—

1. Retention of the present expanded acreages of human food crops, in particular, wheat, potatoes, sugar beet, and barley, but no further increase in these.

2. Increased livestock production made possible by

(a) more land under the plough to provide winter keep for stock indoors, and

(b) 10 per cent. more stock on 10 per cent. less grassland to provide summer keep and some hay, dried grass, and silage as a contribution to winter food supplies.

Increase in Cropping

The change of emphasis from "horn" to "corn" is striking and is shown by the following table:—

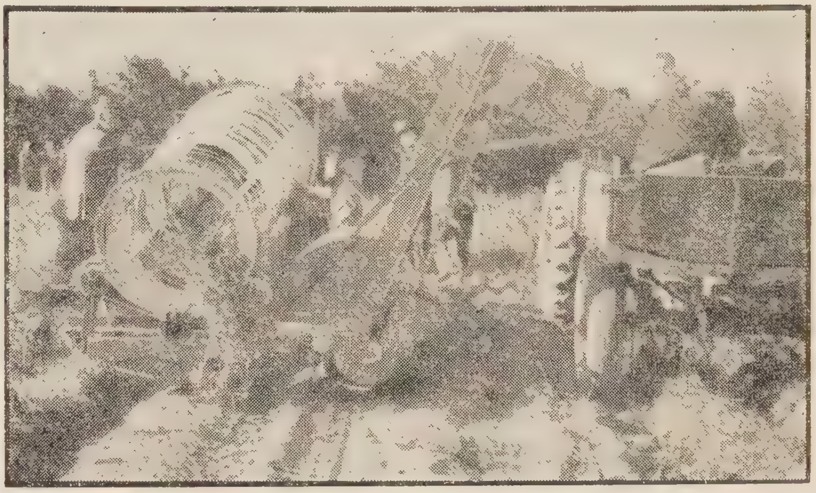
VALUE AT CONSTANT PRICES (BASE = 1945-46)

	Pre-war Per cent.	Post-war Per cent.
Livestock products ..	66	50
Crops	15	30
Horticultural products	17	17

This insistence on the "plough" has to be considered in comparing farming efficiency and output in Britain and in New Zealand. New Zealand farmers can follow their personal bents and exploit sun, rain, clover nodule, and superphosphate to the limit. Possibly if farmers in Britain were able to concentrate on production from livestock and grass (with at least some imported foods to offset New Zealand's better climate) instead of having to grow such large acreages of potatoes and wheat, they, too, could cut down expenditure on labour and perhaps achieve the low costs of production reached by New Zealand farmers. But Britain's wartime experience and present economic position rule out farming based only on grass, and the Agriculture Act is designed to prevent the line of least resistance being followed. It is significant that the United Kingdom farmers' organisations are backing the programme solidly.

On the whole the programme is a success. In spite of the ploughing out of between 6 and 7 million acres of grass, the numbers of cattle have risen by 1 1/3 million since 1939. (Young cattle have increased by 500.000 since 1947.) The milk target has been reached 2 years ahead of schedule, and milk production in January, 1950, was a record. Consumption of liquid milk has almost doubled since 1939 and rationing is now lifted for most of each year. The total production of milk and yield per cow have risen in spite of strict rationing of feeding stuffs. Poultry numbers are well ahead of those for 1939. The number of pigs were reduced severely during the war, but in the last 2 years have increased by more than 1 million. Sheep numbers are up by 2¾ million since 1947 and are now only 5 million down on the pre-war figures. The production of wheat has increased by 30 per cent., the output of potatoes has been doubled, and the quantity of sugar beet produced is 30 per cent. greater than what was obtained in 1939.

Mechanisation is developing rapidly. The number of tractors increased from 46,000 in 1939 to 231,000 in 1948, combine harvesters from none in 1939 to 9000 in 1949, and milking machines from 23,800 in 1942 to 48,130 in 1948.



Britain is now nearly self-supporting in the supply of agricultural machinery and efforts are being made to mechanise the harvesting of root crops. A British-made potato harvester is shown above at work during a demonstration.

Imports from North America of both wheeled and crawler tractors have ceased entirely. Britain is now nearly self-supporting in the supply of agricultural machinery, a big change since 1939 and one that has involved much readjustment on farms. Only a few pick-up balers, combine harvesters, and forage harvesters are now going to Britain, and it is expected that no further dollar machinery imports will be required after the middle of 1950.

More Agricultural Workers

The number of agricultural workers is now greater than in 1939. This trickle of men back to the land is one of the most pleasing features of the expansion programme.

Up to the middle of 1949, 112,000 houses were erected in rural areas, that is, one in every five houses built. Of those houses erected in rural areas by local bodies about one in four were let to farm-worker tenants.

Plans just announced provide for additional silo storage for 21,500 tons of wheat, an increase of 25 per cent. on existing capacity.

An effort is being made to encourage the rehabilitation of hill farms by giving financial aid, and so far 4423 schemes have been submitted for grants.

The cropping part of the programme, however, has lagged behind; for example, it is proving very hard to secure the wheat acreage. An urgent appeal is being made to increase the acreage under the plough by 2 million, and the last part of the expansion programme has been launched with a slogan of "plough for plenty."

Broadly, if 1939 is taken as the basic year and the gross output then is represented by an index of 100, the figure for 1946-47 would be 123 and for 1948-49 it would have reached 135. The target by 1951-52 is 147.

The half-way point has therefore been reached in less than half the time allocated, but, of course, the second half of the task will be the harder.

A very much smaller quantity of feeding stuffs is being imported, and if allowance is made for this by deducting from the output before the war and the output at present that part which comes from materials not produced at home, the increase in production is some 70 per cent. Today about 40 per cent. of Britain's food supply is being produced at home.

Important Role of Science

Very great store is set on the assistance which science must give; in fact the original announcement of the programme claimed that at least half the hoped-for increase must come from the increased efficiency of existing units of production rather than from their multiplication.

Most agricultural research work in Britain is carried out by independent research institutes, universities, and colleges. Their research programmes are co-ordinated by, and financially assisted on the advice of, the Agricultural Research Council.

The Agricultural Research Council is one of the "Big Three" bodies responsible for British research, the other two being the Department of Scientific and Industrial Research and the Medical Research Council. All of these are responsible to a committee of the Privy Council and not to a Departmental Minister. (The Agricultural Research Council also does research work on its own behalf when there is no other suitable provision.) Expenditure on research has increased vastly since before the war.

An interesting wartime development was the setting up of the Agricultural Improvement Council, which is the meeting ground between scientists and farmers. The council has two functions:—

1. To consider the current results of agricultural research and to advise the Ministry of Agriculture which of these should be passed on as quickly as possible to farmers through the extension services.

2. To receive information from farmers (through the extension services) regarding current problems requiring investigation, and to advise the Ministry which of these should be brought to the notice of the Agricultural Research Council with a view to research work being initiated or which should be investigated on the National Agricultural Advisory Service Husbandry farms or dealt with in some other appropriate way.

Change in Extension Services

Perhaps the biggest change since 1939 on the scientific side has taken place in the agricultural extension services in England and Wales. In 1946 the responsibility for agricultural advisory work was taken over from local authorities by the Ministry, and the National Agricultural Advisory Service came into being. The foundation of the new service is the District Advisory Officer, who is provided with office accommodation and, if required, non-technical assistance. He covers a territory in which there are about 1000 farmers. He is the "general practitioner" of the service and is intended to deal initially with all farmers' problems and to call in specialist advice if he needs it.

The service exists in three strata. First, at county level, the County Agricultural Officer is responsible for all the work within the county, in which on the average there are perhaps 5 to 7 district officers. He also forms a connecting link with the County Agricultural Executive Committee, of which he is the chief officer. Second, a provincial centre co-ordinates the advisory work of a convenient group of counties and provides most of the specialist services. There are eight of these provinces. Third, there is a small (London) headquarters staff of senior technical officers under a Director-General. The service is also to have a chain of agricultural and horticultural husbandry farms at which the results of current research can be tested out under practical farming conditions and where research workers have facilities to test their initial results in varying environments. Sixteen agricultural and several horticultural farms are planned and some are in operation. There are also a veterinary service and an agricultural land service. The National Agricultural Advisory Service is heavily involved in securing the success of the expansion programme.

Britain is now in the midst of the third major food battle in 35 years. Victory is not going to be easy for a country where the population is so great in relation to area of land that the soil available for food production per person is now down to a plot of ground about 50yds. by 50yds. Moreover, competent opinion seems satisfied that in 50 years it will be extremely hard for the world to feed its expected population then of 3000 million. Therefore the answer cannot lie in unlimited imports from overseas, but must depend largely on British agriculture itself. It is pleasing that New Zealand's main export products (butter, meat, and wool) do not embarrass British agricultural economy, but in fact fit in well with it and will continue to do so even if the expansion programme there is fully achieved.

DAIRY PRODUCE GRADED FOR EXPORT

THE following figures showing quantities of dairy produce graded for export during March and for the 8 months ended March 31, 1950, with comparative figures for the same month and 8-monthly period of 1949, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER—

		Tons			Tons
Period	Creamery	Whey	Total	Precentage inc. or dec.	Total in store at end of mth.
March, 1950	11,122	305	11,427	—	34,793
March, 1949	13,695	283	13,978	—	35,714
Increase or decrease	—2,573	+22	—2,551	—18.250	—921
For 8 months ended 31/3/50	133,256	2,527	135,783	—	—
For 8 months ended 31/3/49	127,690	2,271	129,961	—	—
Increase or decrease	+5,566	+256	+5,822	+4.479	—

CHEESE—

		Tons			Tons
Period	White	Coloured	Total	Precentage inc. or dec.	Total in store at end of mth.
March, 1950	8,022	2,378	10,400	—	28,774
March, 1949	9,308	728	10,036	—	19,320
Increase or decrease	—1,286	+1,650	+364	+3.626	+9,454
For 8 months ended 31/3/50	66,858	18,816	85,674	—	—
For 8 months ended 31/3/49	75,736	4,197	79,933	—	—
Increase or decrease	—8,878	+14,619	+5,741	+7.182	—

If these figures are converted into butterfat equivalent, there is an increase of 5.002 per cent. in butterfat graded for the 8 months as compared with the corresponding period of the preceding season. It should be noted that the above figures refer only to butter and cheese graded for export, and that owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

World Census of Agriculture

THE collection of information for the world census of farming activities being taken this year by the Food and Agriculture Organization of United Nations is now well under way in New Zealand.

THE purpose of the census may best be indicated by quoting the following from the introduction to FAO's "Programme for the 1950 World Census of Agriculture":—

"In the 1950 World Census of Agriculture it is intended that each Government will obtain accurate and comparable information on its agriculture, including information on:—

"(a) The number of agricultural holdings and their principal characteristics such as size, form of tenure, utilisation of the area, utilisation of labour, implements, and mechanical power, etc.

"(b) The number and characteristics of the people who secure their livelihood from agriculture.

"(c) Areas under crops and numbers of livestock.

"(d) The volume of production of all important agricultural products."

The usual annual collection of agricultural and pastoral statistics, including supplementary collections of crop acreages and yields made by the Census and Statistics Department either directly by mail or through the Police Force, together with the annual sheep returns collected by the Department of Agriculture, more than cover the minimal list as envisaged by FAO, but it was felt that the occasion would be appropriate to obtain a certain amount of additional information on a number of items not normally covered.

It was decided therefore that the Census and Statistics Department, which for many years has collected and tabulated agricultural and pastoral statistics, should be responsible for taking the census, but that as the schedule would be considerably larger and more comprehensive than usual, trained enumerators should call on every farmer and assist in completing the questionnaire. Though many areas have already been covered, there are some counties, especially where the number of holdings is very large, where many farmers have not yet been visited by the enumerator for their district.

The furnishing of agricultural and pastoral statistics is, of course, a requirement of law, but farmers more than anyone else benefit from having complete, accurate, and adequate farming statistics. Only if they are available can trends in production be observed and studied and policy framed.

The possession of basic statistical information on farming on a world-wide basis is vital to the achievement of FAO's objectives of increasing the production and improving the distribution of world food supplies.

Survey of Wheat Crops to Define Factors Affecting Yields

By JEAN G. MILLER, Biometrician, Department of Agriculture, Wellington.

IN any one season yields from wheat crops even in the same district and on similar soil vary considerably. Frequently the differences between high- and low-yielding crops to a large extent reflect the differences between good and bad farming, so it is important to know and evaluate the factors that distinguish between good wheat farming and bad. Manuring experiments with wheat have been carried out for many years, and fertiliser practices for each district have now become almost standardised. Similarly, new varieties have been introduced to the farming community, tested, and accepted, and as a result not more than two or three varieties are now grown to any extent.

IN an effort to define the factors that determine the yield of a wheat crop, Investigating Officers of the Extension Division of the Department of Agriculture have been conducting a survey of all crops in selected areas near Christchurch and Ashburton, chosen after a soil survey had been made.

The Christchurch area covers parts of the Yaldhurst, Prebbleton, Templeton, and Springston districts. All the soils in this survey area are recent alluvials, formed from alluvial gravels, sands, and silt deposited by the Waimakariri River. Subsequently a number of old overflow channels cut their way through the northern portion of the area, and many smaller courses, now dry, dissected the remainder to a varying degree. Paddocks a considerable distance from the river in the Weedons, Springston, Lincoln, and Prebbleton districts in general consist of finer alluvial fractions than those in the Templeton and Yaldhurst districts. This simple picture has been modified in places by the action of old watercourses depositing sands and gravels among the more silty soil types. In the somewhat lower-lying south-western portion, in the vicinity of Lincoln and Springston, some seepage water is received even in the driest periods.

The fields in the Ashburton area are all in the Methven, Lyndhurst, Winchmore, and Rakaia districts. The soils of this area are all of the Orari or Aylesbury silt loam types. On the very dry soils only 9 to 18in. of silt loam covers the stones, but on the heavy soils the depth to the stones is more than 36in.

A questionnaire was issued to all the farmers in these districts and they co-operated very well, contributing a wealth of information on general farming practices as well as data about the wheat crop. The completed schedule sheet for each field showed the soil type of the field, the dates of all the cultivations it had received, the crops that had been grown in it for the previous 3 years, the variety sown and its rate of seeding, the amount of fertiliser applied, the dates of sowing and harvesting the crop, and the number of bags of firsts and seconds grain that was harvested. As the area of each field had been determined carefully, its total yield in bushels per acre was known accurately. Differences between yields were then analysed in relation to many of the factors listed.

When the fields were separated into classes it was found that the number in each varied greatly, so that straight averages of the yields in each class would not give a true picture. For instance, on one soil type about 70 per cent. of the fields were autumn sown and 30 per cent. spring sown, whereas on another soil type almost all the fields were spring sown. If the averages of all the autumn-sown crops and of all the spring-sown crops had been taken, the differences between those two averages would not have represented the true effect of autumn sowing compared with spring sowing; it would have been as much a soil-type difference as a season-of-sowing difference. Therefore a special kind of analysis was performed in which different numbers of fields in the classes were allowed for and the effect of each factor was obtained free from the effects of all the other factors.

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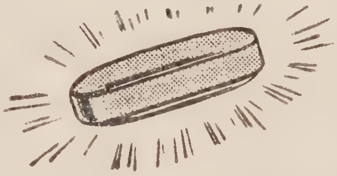

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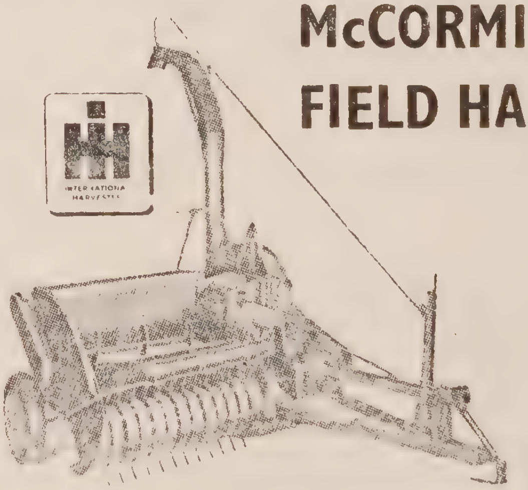

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During the first 2 years of the survey in the Christchurch area conditions were unseasonable and the results could not be termed typical; however, the third and fourth years' results were obtained in normal seasons for the district. In the first year (1945-46) the autumn was very wet and cold and few crops were sown before spring; the autumn of the next year was exceptionally fine, so almost all crops were autumn sown. Results are available for 4 years for the Christchurch area and for 1 year for the Ashburton area.

Christchurch Area

Though all the farms in the Christchurch area are of the same general soil type, many variations occur within it, particularly in water-holding capacity. As this was considered to be the main feature of the soils likely to affect yield, the soils were grouped under three headings, light, medium, and heavy, the heavy soils being most retentive of moisture, though not comparable with the "heavy" soils of the Tai Tapu region, for instance.

Effect of Soil Type

The analysis revealed no differences in yield caused by soil type except in 1945-46, when very heavy rain in November and early December was followed by a very dry spell in late December and January. In that year the medium soil yielded 10 bushels per acre above average and the heavy soils 10 bushels below average, the light soils giving yields practically equal to the mean for all soils. However, there were marked differences between spring- and autumn-sown crops on some of the soils, and the number of autumn-sown crops in that year was too small to make the soil-type comparison fair.

In most years soil differences within this one general soil type do not seem to be important in determining yield. A further study will be made with the soils grouped according to their fertility levels. However, the soil type considered does not cover by any means all wheat-growing soils of the Christchurch area, and the effect of soils in general on wheat yields is, of course, most marked.

Varieties

Only two varieties were considered, Cross 7 and Tuscan (either Fife Tuscan or Solid Straw Tuscan), as no other variety was grown in more than one or two fields each year. There were no consistent differences between the two groups, though Cross 7 was twice better than, once equal to, and once worse than the Tuscan group. In the last year, 1948-49, Fife Tuscan and Solid Straw Tuscan were analysed separately, but their average yields differed by only 1 bushel per acre.

Date of Sowing

Sowing dates were divided into two groups—autumn sown (before the end of June) and spring sown (after July 1). As very few crops were sown in July, spring sown really means after the beginning of August.

In the cold, wet season of 1945-46 and again in 1948-49 autumn-sown crops did no better than spring-sown crops. However, in 1946-47 and 1947-48 autumn-sown crops showed a distinct advantage over spring-sown crops, the difference being 22 bushels per acre in 1946-47 and 7 bushels in 1947-48. Autumn-sown crops have never been worse than spring-sown crops. Results for each month of sowing considered separately were not consistent.

Preceding Crops

The previous history of the fields was the most important factor studied. In the early years of the survey—just at the end of the war—a wide variety of crops was being grown and a multitude of rotations being used. As a result the only possible study was that of the effect of different crops in the field in the year immediately before the wheat crop. Differences from the average yield are shown in the following table:—

	1945-46 (bushels)	1946-47 (bushels)	1947-48 (bushels)
Average of all wheat crops	34.0	39.6	42.6
Average yield of wheat crops after cereals	26.0	37.4	21.4
Average yield of wheat crops after peas or potatoes ..	38.1	37.2	46.2
Average yield of wheat crops after grass or fallow ..	42.2	60.0	60.4
Average yield of wheat crops after brassicas	29.8	25.5	None sown

These results are what might be expected in normal circumstances, though the average of the "grass or fallow" group is rather higher than was expected. However, the variability in results is high, and results from Ashburton and also from Christchurch in 1948-49 are somewhat different. Consequently, undue importance should not be given to the data summarised in the table.

From the returns for the survey fields in 1948-49 it was apparent that rotation practices were becoming much more settled, and almost all the fields fitted into one of the following 10 rotations; analysis by rotations gives much more information than is obtained by considering only the one preceding crop, and it is hoped that a re-analysis of the 1947-48 results can also be made on this basis:—

Rotation	1946-47	1947-48	1948-49
1 ..	Grass	Grass	Wheat
2 ..	Grass	Potatoes	Wheat
3 ..	Grass	Other crop	Wheat
4 ..	Wheat	Wheat	Wheat
5 ..	Peas	Wheat	Wheat
6 ..	Wheat	Peas	Wheat
7 ..	Any crop	Potatoes	Wheat
8 ..	Any crop	Peas	Wheat
9 ..	Fallow in either year		Wheat
10 ..	Any crop	Fed-off crop	Wheat

The effects of these rotations on the yields were:—

	Bushels per acre
Average yield of all crops	40.4
Difference from average—	
Rotation 1	— 4.7
Rotation 2	+ 0.4
Rotation 3	— 2.0
Rotation 4	— 6.3
Rotation 5	— 5.8
Rotation 6	+ 1.3
Rotation 7	— 4.2
Rotation 8	+ 9.2
Rotation 9	+ 5.8
Rotation 10	+ 6.1

As in the 3 previous years, the yield of wheat after a cereal crop was the poorest. The effects of one and two previous cereal crops on the yield were little different, but the inclusion of a crop of peas between the two wheat crops brought the yield of the last wheat crop up to average or slightly above. The highest yields came from crops which followed peas, a fallow, or a fed-off crop when these were in a cropping rotation—that is, where the grass had been ploughed up for at least 2 years before the sowing of the wheat crop. The crops straight out of grass or in a grass-crop-wheat rotation did not do well, and this result is different from that obtained in other years of the survey.

More light is needed on the reason for these disagreements before the effect of previous history can be understood completely. In future years the survey will be continued on slightly different lines, with more attention given to this aspect, as "previous history" has been shown to be one of the most important factors affecting the yields of wheat.

Ashburton Area

The results for the Ashburton area are available for only 1 year, 1947-48, and here again the preceding crop was the most important factor. The soil types, grouped according to water-holding capacity, showed considerable differences. However, in the Christchurch area the effect of soil varied considerably from year to year, and more information is needed before much importance is attached to the Ashburton figures, which showed average yields of 30.6 bushels per acre on very dry soils, 31.5 bushels on medium soils, and 38.4 bushels on heavy soils.

The difference between the two varieties, Cross 7 and Tuscan, was too small to be significant, but was slightly in favour of Cross 7.

Very few crops were sown after July 1, so no reasonable comparison of spring and autumn sowings could be made.

Preceding Crops

Average yields after various preceding crops were as follows:—

	Bushels per acre
All crops	33.5
Wheat after a cereal	38.1
Wheat after a legume	36.5
Wheat after brassicas ..	32.9
Wheat after grass or fallow ..	28.4

At first glance these results, particularly those after cereals and after grass or fallow, were contrary to expectation. However, closer inspection of the survey sheets showed that many of the pastures in the "grass or fallow" class were old browntop swards, and several were infested with grass-grub. When wheat is sown on this class of land early and frequent cultivation is necessary for good results, but many of the fields in the survey were insufficiently worked before they were sown to wheat, with resulting low yields, which affected the average for this group.

Similarly, the high yields obtained after cereal crops may have been influenced by the same conditions. The first cereal crop after grass, being poor would not deplete the soil seriously, while the additional working would put the soil into good condition for the second cereal crop, which was the one measured by the survey. No conclusions about the effect of other crops before wheat in Ashburton can be drawn yet.

The rotations in the Ashburton area frequently are different from those in the Christchurch area, mainly in that about 30 per cent. of Ashburton wheat crops are sown after grass but only about 5 per cent. of the Christchurch crops follow grass. With such a small sample from Christchurch, it is possible that the early years' results were misleading in showing such a good yield of wheat after grass, especially as the 1948-49 Christchurch figures do not support this. However, the proportion of fields sown after good pasture may have been higher in Christchurch in some years. In the investigations for the coming year an accurate inspection is being made of all pastures about to be ploughed up for wheat, and the effect of the state of the pasture on the wheat yield will be studied in detail.

Cultivation Practices

The amount and type of cultivation before sowing are different for almost every field, so no major trends could be observed. However, the information about cultivations is being related to some of the other factors being studied. Crops following grass yielded poorly in the Ashburton area, and lack of adequate cultivation was suspected of being one of the reasons for poor wheat yields. The date of first ploughing was therefore investigated as a test of adequate cultivation. However, fields were too few for accurate comparisons to be made and they varied so greatly that no conclusions could be obtained.

Summary of Results

The survey has shown so far that an important factor affecting wheat yields is the previous rotational history of the paddock. Though the evidence is not yet conclusive, the best yields appear to be obtained after a good grass pasture, after peas, or after fed-off crops. However, if the pasture is poor, infested with weeds or grass-grub, or inadequately worked, the result may be worse than that obtained by sowing after another cereal crop.

There is little difference between the yields from wheat varieties being used at present, but Cross 7 may be giving slightly better yields than the Tuscan group (Fife Tuscan and Solid Straw Tuscan).

Though autumn sowing does not always give better results than spring sowing, it never gives worse and can result in very much better wheat yields. Such a result, of course, depends to some extent on the weather and soil conditions at the time of sowing.

Results so far have not completely answered the questions investigated, but as more information is collected definite conclusions about the best cultural practices for wheat growing are expected to be established.

◆

Brewers' Grains as Stock Food

IN some districts the by-products of breweries are available and may form a useful adjunct to the diet of stock where the land is too valuable for much cropping, as is the case close to larger towns and cities. In this article D. H. LeSouef, Veterinarian, Department of Agriculture, Wellington, describes the storing and feeding of brewers' grains.

USED barley grains are obtained daily in a wet state from the brewery and are consequently heavy in proportion to their food value, so that it does not pay to cart them long distances. At the farm they are tipped on to a concrete floor and allowed to drain for 12 hours or more before being fed into the individual troughs. This type of fodder cannot be fed without roughage, which is essential to proper cudding, so that when ample pasture grass is not available hay must be provided, and many cows refuse the grains until they have had roughage. Wet grains may be fed in quantities of 20 to 30lb. per cow per day and dry grains up to 6lb., but the latter are not as palatable as the former, although they contain 70 per cent. more digestible protein and twice as much fat as wheat bran, but are lower in carbohydrates.

Storing Grains

A stock owner contracting for the grains must be prepared to take them all the year round, and as frequently as the brews are finished, so that at certain times of the year there is a surplus, which may be stored for later use in a wet or a dry state. Old-established dairy farms in the vicinity of Wellington have used both methods over the years with varying success, according to circumstances.

Wet Method

Where grains are stored wet they are put into a silo of the dug-out pit or, preferably, concrete type with drainage, and a weighted cover is placed over them to consolidate the mass. Salt, in the proportion of 25lb. to the ton, must be added during the pitting process. The food will keep for months or even years if well made and kept airtight and comes out with the consistency of cheese.

Dry Method

If grains are to be stored dry the fresh wet product is spread out in a thin layer on a concrete floor in a sunny situation to dry, being turned several times in the process. When thoroughly dry the grains are bagged and stored indoors. This method involves a good deal of work and tends to be upset by vagaries of the weather such as sudden showers and high winds. Where large quantities are involved a special drying plant could be used, but this would not pay an individual farmer.

Feeding Grains to Horses and Sheep

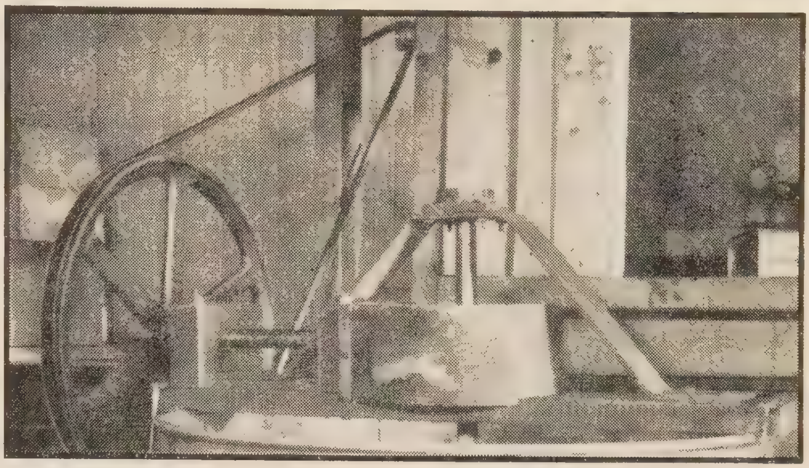
The grains are suitable food for stock other than cattle. Horses will take the grains and do well on them, if they are fed with oats in equal proportions, as an addition to the normal chaff diet. Sheep may be fed up to 1lb. per head per day under the same circumstances as cattle, but for pigs the grains are not a suitable food, as they are not thoroughly digested by pigs and hence are uneconomic.

Wet grains must be fed within 3 days of collection in summer, as acidity followed by mould formation develops, spoiling the product as a food.

Dairy cows feeding on brewers' grains.

Use of Stirrer Ensures Smooth Grain in Honey

TO maintain the popularity of honey with consumers beekeepers should be careful to see that nothing but smooth-grained honey is placed on the market. The demand for liquid honey is very small compared with that for well-packed, fine-grained honey. To encourage beekeepers to place their honey on the market in its most attractive condition the construction of a simple type of honey stirrer is described in this article by C. R. Paterson, Apiary Instructor, Department of Agriculture, Hamilton.



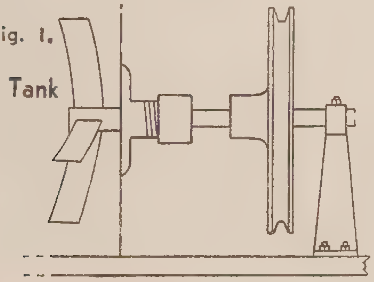
Movable stirrer set up in honey house.

HONEY varies greatly according to the nectar from which it is derived, and very few honeys will remain in a liquid condition for any length of time. The floral source of honey not only has a definite bearing on the time taken to granulate, but also on the smoothness of the grain. It can generally be accepted that honeys which granulate very quickly will have a comparatively smooth grain, and those which take a considerable time will have a coarse grain. Honeys from pohutukawa and rata come into the first group; most other honeys take longer to granulate, and if left untouched, may granulate with coarse crystals. For many years it has been known that beekeepers can remedy this drawback of coarse-grained honey if they are prepared to undertake the adding of a small amount of starter honey, stirring, and temperature control. Before the construction of a honey stirrer is described a summary of points governing granulation will be of interest.

Extracted honey may have a considerable number of coarse-grained crystals in it. These can be the result of not drying out extracting combs the previous autumn, or extracting a few combs of the past season's honey that has partially granulated. Honey in this condition will not respond to the addition of starter honey, as the coarser crystals predominate. The only way to rectify this is to heat the honey to approximately 130 degrees F. until all crystals are destroyed.

The temperature of the honey should be about 75 degrees F. before the starter honey is added. Temperatures above this level are liable to melt the very fine crystals in the starter honey.

Fig. 1.



The starter honey has to be thoroughly mixed into the liquid honey. This is done by stirring without incorporating any air bubbles.

The proportion of starter honey added is generally from 5 to 10 per cent. of the bulk. More starter will hasten granulation, provided temperatures are right.

Once starter has been thoroughly incorporated throughout the honey, packing can begin.

After packing, honey should be subjected to a temperature of approximately 57 degrees for about 4 days. (This applies more to summer packing when air temperatures are well above 57 degrees, and cooling rooms are necessary only for these periods.)

Toward late autumn and winter, when evenings are cooler, stirring can be carried on a little longer, and after packing, the honey will be found to set firm in a few days.

Methods of Stirring

Depending on the circumstances, the following types of stirrers may be used:—

Wooden Stick or Paddle

For small quantities of honey a wooden stick or paddle stirrer will be found adequate. When tanks of 1-ton capacity each have to be dealt with a considerable amount of energy is required to get the starter thoroughly mixed. Even with the most careful work there is a tendency for streaks to form in the packed honey. This is due to small portions of the liquid honey not receiving the quota of starter.

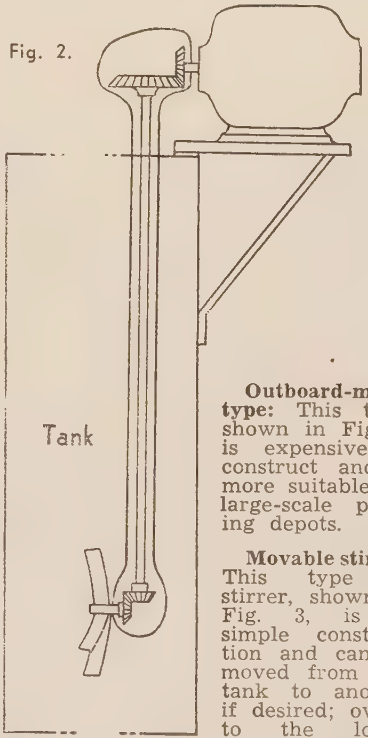
Nelson Stirrer

The Nelson stirrer is constructed on the pattern of a cream stirrer. A heavy circular plate has a number of holes bored in it of about 1in. in diameter. A rod with a handle on the other end is securely screwed or welded to the centre of the plate. By moving this up and down in the honey a fairly good mix is secured. Do not bring the plate above the surface of the honey, or too much air will be mixed into the honey.

Mechanical Stirrers

Propeller type: This mixer consists of 4 curved blades welded to a collar which fits on to a shaft set in the side of the honey tank. As this shaft has to rotate approximately 100 times a minute, a fairly powerful motor is required (at least 1 h.p.). Fig. 1 shows the set-up of this mixer. It is more suited for a quick mix, after which the honey is placed in a cool room.

Fig. 2.

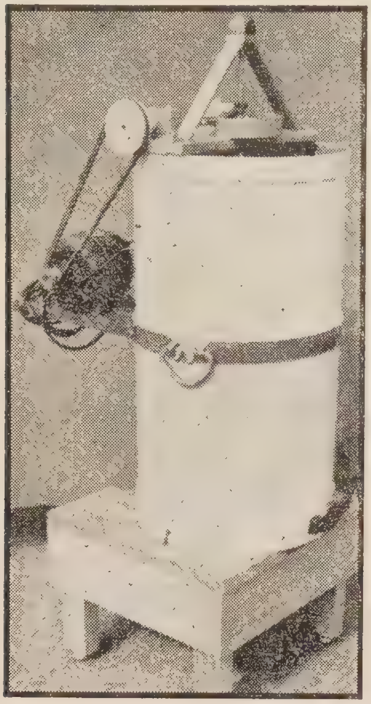


Outboard-motor type: This type, shown in Fig. 2, is expensive to construct and is more suitable for large-scale packing depots.

Movable stirrer: This type of stirrer, shown in Fig. 3, is of simple construction and can be moved from one tank to another if desired; owing to the lower speed of the mixing arms, a much smaller motor ($\frac{1}{2}$ h.p. is usually suitable) will drive it.

The construction of a movable stirrer is comparatively simple and should offer no difficulties to the beekeeper who is handy with tools. No

CONSTRUCTION OF MOVABLE STIRRER . . .



Honey stirrer fitted to a mixing tank which is a milk can set on a stand having ball castors.

dimensions can be given, as the size will vary according to the tank that is to be used with the mixer.

Following is a description of the material that will be required. (The letters against each item correspond to markings on Fig. 3.)

A—Cross-member. This can be made of 6in. x 2in. well-seasoned timber, totara for preference. The length should be sufficient to allow about 2in. over the edge of the tank. A 1in. hole is bored in the centre for the shaft. If the stirrer is to be in constant use, it will be best to have a small brass plate, recessed to take a ball bearing of suitable size, bolted over this hole.

B—This bracket holds the top bearing of the mixer spindle and gives rigidity to the whole unit. It is made of flat iron 2½in. wide and ¼in. thick. When this is being bent into shape see that it sits perfectly flat on the cross-member. A 1in. hole is bored in the top for the spindle. A plate with ball bearing can also be used here as shown at B1. A hole is also bored at B2 to allow the driving shaft to go through. Drill four ⅜in. holes in the bracket for bolting it on to the cross-member. Before boring the holes in the wood place the shaft in position and move the bracket into position, ensuring that the upright shaft is at right angles to the cross-member. Check to see if the shaft turns freely. Clamp the bracket in this position and then bore the holes.

C—1in. steel shafting is used for the mixer shaft. Here again its length will depend on the depth of the tank.

D—This is a cover made of any light metal to prevent any grease which may come off the gears from falling into the honey. The sides and bottom, which has a 1in. hole in the centre, are placed in position before the gears are assembled. The top rests on the side and can be lifted up sufficiently to oil or adjust the gears.

E—The bevel gear and pinion will most likely be parts secured from motor-car spare parts; the ratio of this type of gearing is generally about 3 to 1. Old model T Ford crown wheels are quite suitable and require a casting or plate for bolting on to.

F—The bearings for the driving shaft can be seen at F, F. They are made of hardwood, and here again if the stirrer is to be given much use, light ball races should be let into each wooden block. This, of course, has to be done on a lathe to secure accurate alignment. The shaft can be 1in. or ¾in. steel shafting.

G—The V pulley is approximately 20in. in diameter and is a type in common use on water pumps. With a 2in. pulley on the electric motor, a pulley of this size will turn the stirrer at about 50 revolutions per minute.

H—Three stirrer arms are required; their length should be about 2in. short of the diameter of the tank and they can be made of oregon pine or of metal. Pieces of wood approximately 2in. square should be selected and a 1in. hole bored in the centre of each. With a small saw, cut lengthwise for about 1½in. on each side of the hole. This allows the holding bolts to draw the wood hard against the spindle. To prevent the bolts from sinking into the wood small metal plates on each side should be used. The arms are now shaped to give them a propeller-like action. See that all are cut with the same pitch and placed on the shaft in positions which are staggered. It is advisable to give the arms a coat of clean, hot beeswax before assembling them. The shaft can be given a coat of aluminium paint and when thoroughly dry lightly sandpapered to remove any surplus. Instead of the wooden arms shown in the diagram metal arms can be made by using short pieces of flat iron and welding them on to metal collars at the appropriate angle. Set screws are then placed in the collars to fix the arms to the shaft. Metal arms can be tinned to complete a permanent job.

Holding rods are used for keeping the stirrer firmly in position on the tank. The motor, which needs to be about ½ h.p. can be set on the floor. A shorter belt will be required if the motor is fixed on a wall bracket, but the placing of the motor is a matter which will depend on the beekeeper's requirements.

The movable type of stirrer is giving satisfaction in many honey houses. No alterations or fittings are required for the honey tanks, and if desired, the stirrer can be lifted from one tank after stirring has been completed into another tank. Construction is simple and the cost reasonable.

Mechanical stirring relieves the beekeeper of much manual work and gives a product superior to that packed direct from the tank.

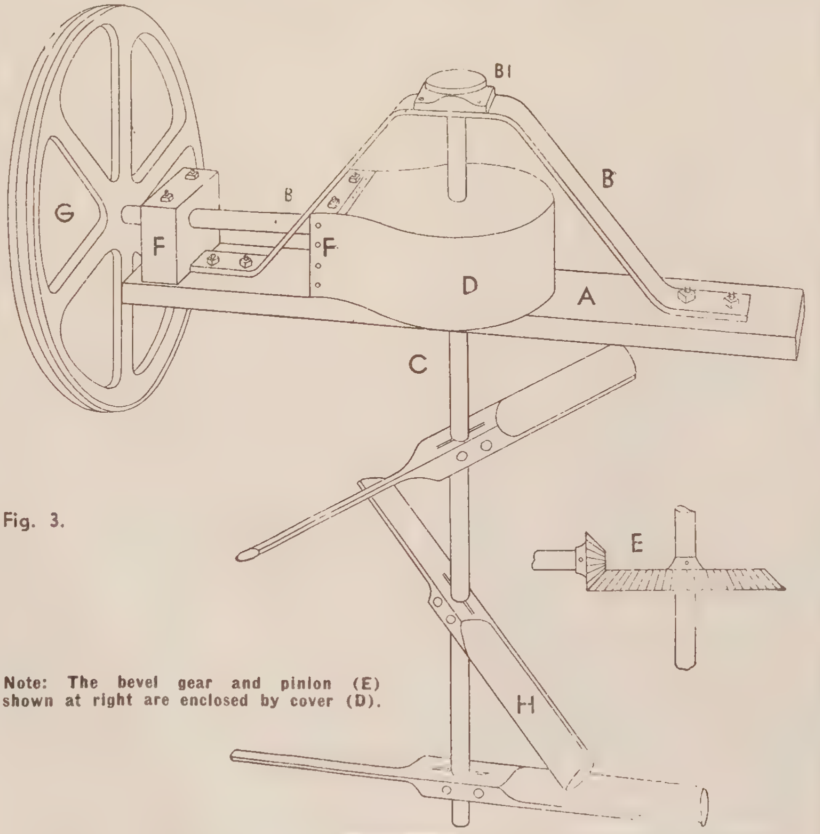


Fig. 3.

Note: The bevel gear and pinion (E) shown at right are enclosed by cover (D).

New Zealander Second in Junior Farmer Contest at Sydney Show

RICHARD HARRIS, Gisborne Young Farmers' Club, gained second place in the Australasian junior farmer leadership contest sponsored by the Australian Broadcasting Commission and broadcast from the Sydney showground studio during the Sydney Easter Show. The contest was the second in which the New Zealand Federation of Young Farmers' Clubs had taken part, Gilbert Evans, Carterton Club, gaining second place in 1949.

THE final at Sydney was contested by the winners of elimination contests held in the six Australian States and in New Zealand, and an eighth competitor represented the National Federation of Young Farmers' Clubs of England and Wales. The judges were Professor R. J. A. MacMillan, Dean of the Faculty of Agriculture, Sydney University (agricultural knowledge); Mr. H. D. Black, Senior Lecturer in Economics, Sydney University (leadership qualities); and Mr. C. Moses, general manager, Australian Broadcasting Commission (radio personality and voice). As on former occasions the questionmaster was Mr. B. Carter, a well-known rural commentator of the Australian Broadcasting Commission.

The Minister of Agriculture, Mr. Holyoake, with the finalists in the leadership contest in New Zealand. From left—R. Harris, Wellington Council (winner and second in the Australasian contest); R. G. Elliott, Canterbury Council; Mr. Holyoake; H. C. McRae, Auckland Council; J. Stokes, Otago-Southland Council.

Competitors

The competitors were O. Osler (Queensland), G. Shelton (Victoria), M. Marston (Western Australia), L. Went (Tasmania), G. Trevor (South Australia), R. Martin (New South Wales), R. Harris (New Zealand), and P. Brewis (England). P. Brewis won by a narrow margin from R. Harris, and M. Marston was third.

Preliminary Contests

In the selection of the New Zealand candidate preliminary contests were held among club nominees in 31 Y.F.C. districts, and the district winners took part in four council contests, broadcast from stations at Auckland, Palmerston North, Christchurch, and Dunedin.

The four council winners, H. C. McRae (Auckland), R. Harris (Wellington), R. G. Elliott (Canterbury), and J. Stokes (Otago-Southland), met in Wellington for the Dominion final, which was broadcast from all national stations on Tuesday, March 14. Judges were Messrs. R. B. Tennent, Assistant Director-General, Department of Agriculture (agricultural knowledge), A. P. O'Shea, secretary, Federated Farmers of New Zealand (leadership qualities), and B. Beeby, supervisor of productions, New Zealand Broadcasting Service (radio personality and voice). Mr. R. Bevin, executive officer of the New Zealand Meat and Wool Boards' Economic Service, was questionmaster. The Minister of Agriculture, Mr. Holyoake, was also present at the studio

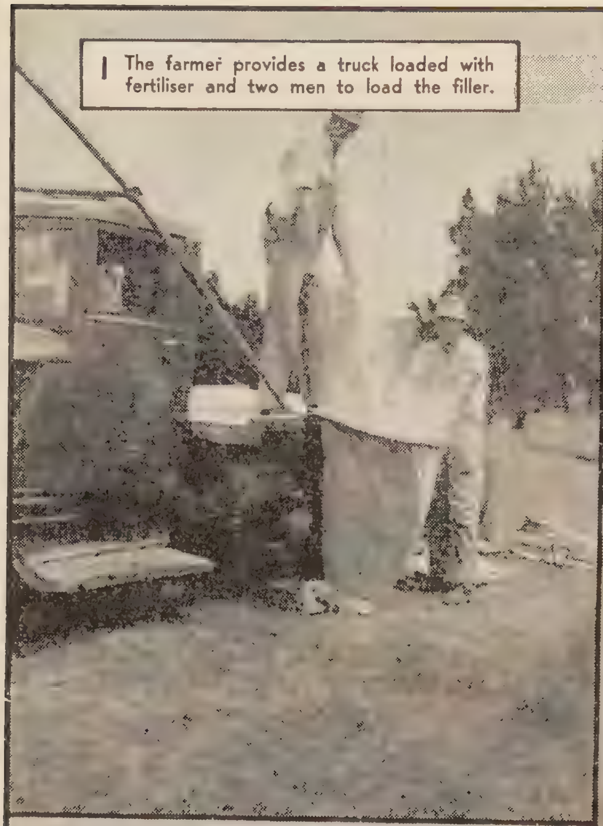
[*"The Australian Junior Farmer" photo.*

The place winners in the Australasian junior farmer leadership contest. From left—M. Marston, Western Australia (third); P. Brewis, England (first); R. Harris, Gisborne (second).

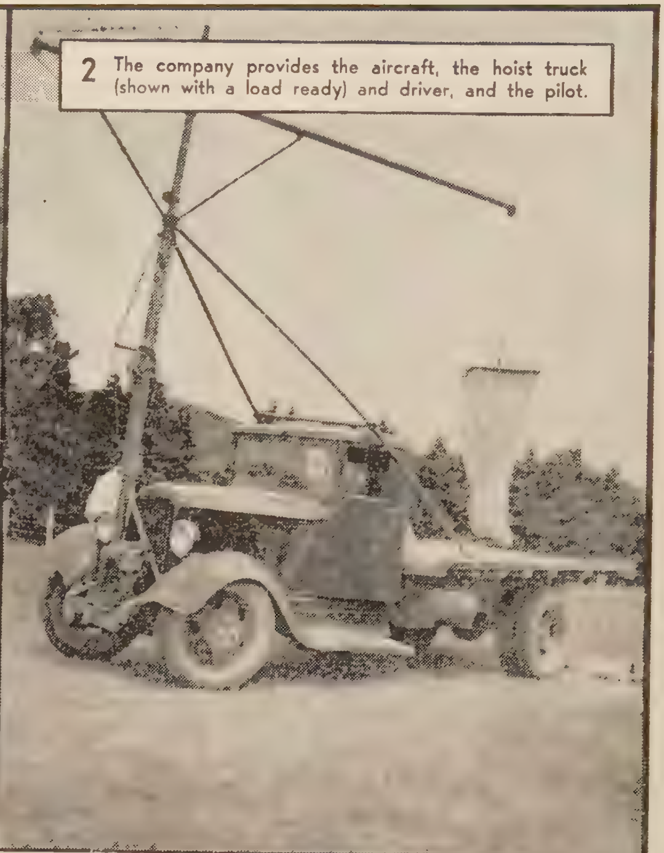
RETURNS OF SHEEP OWNED DELAYED THIS YEAR

ON page 366 of the April "Journal" sheep owners were reminded that under the Stock Act returns showing the numbers of sheep kept at April 30 were required to be made before May 31. Because of printing delays the time for sending in returns has been extended to July 14 this year and forms will be sent out by Inspectors of Stock toward the end of June

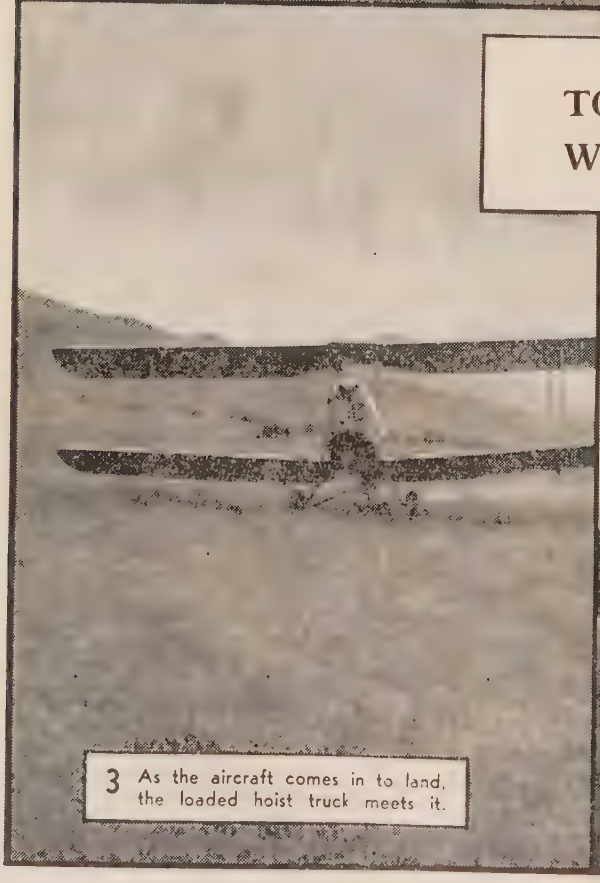
TOPDRESSING HILL COUNTRY WITH A LIGHT AIRCRAFT



1 The farmer provides a truck loaded with fertiliser and two men to load the filler.

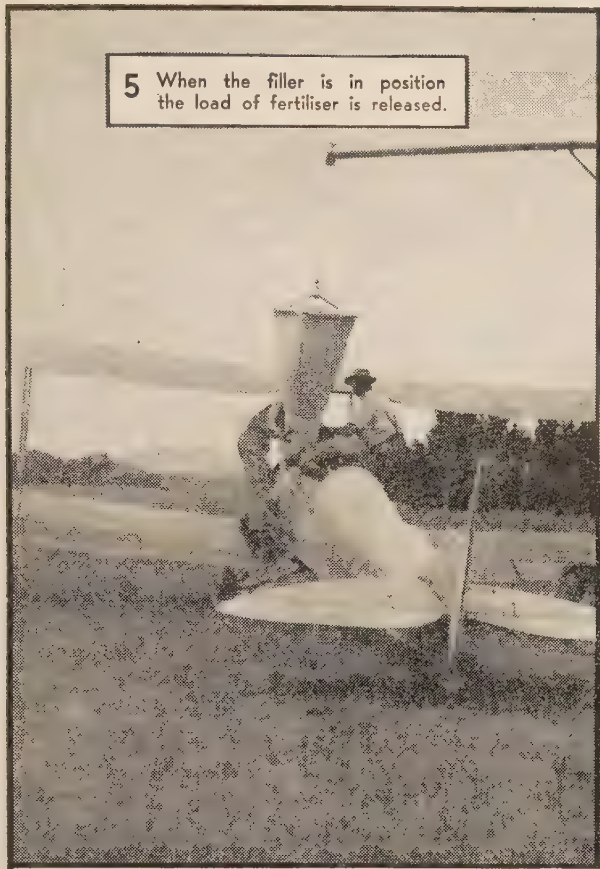


2 The company provides the aircraft, the hoist truck (shown with a load ready) and driver, and the pilot.

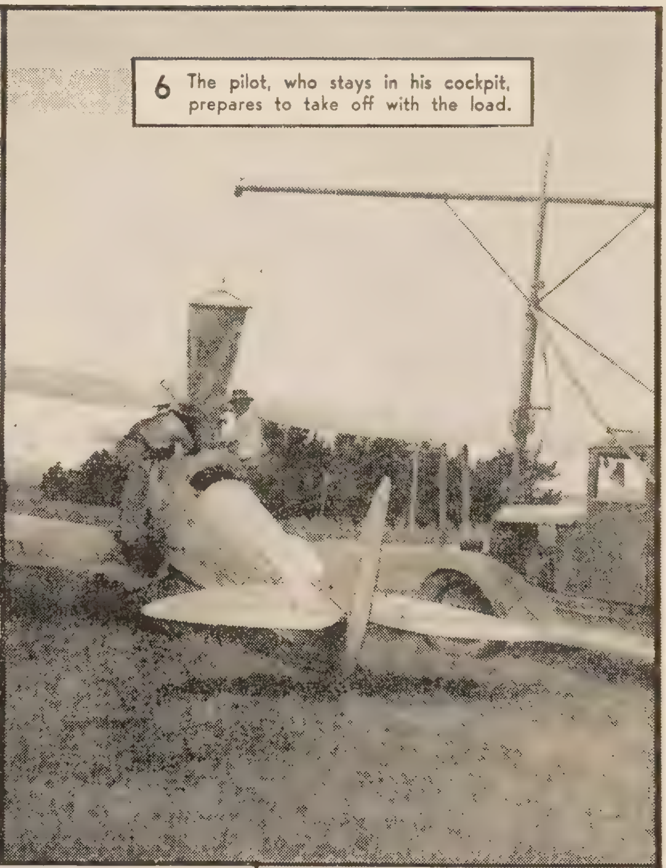


3 As the aircraft comes in to land, the loaded hoist truck meets it.

4 The farmers guide the filler to the hopper in the aircraft.



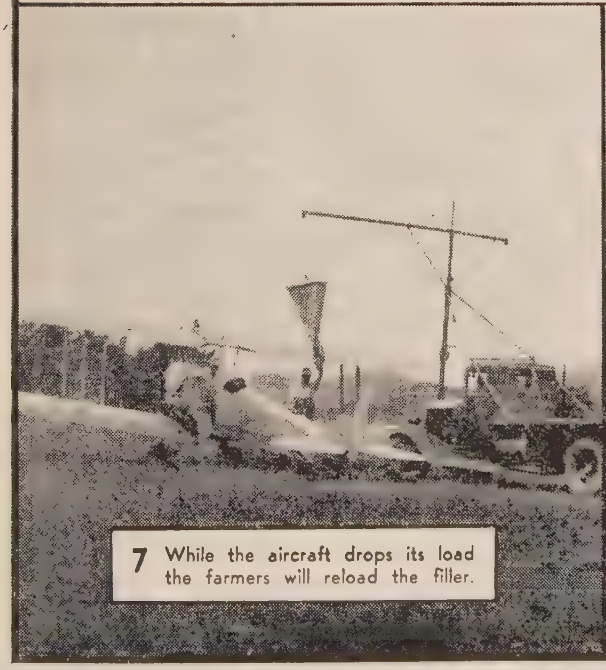
5 When the filler is in position the load of fertiliser is released.



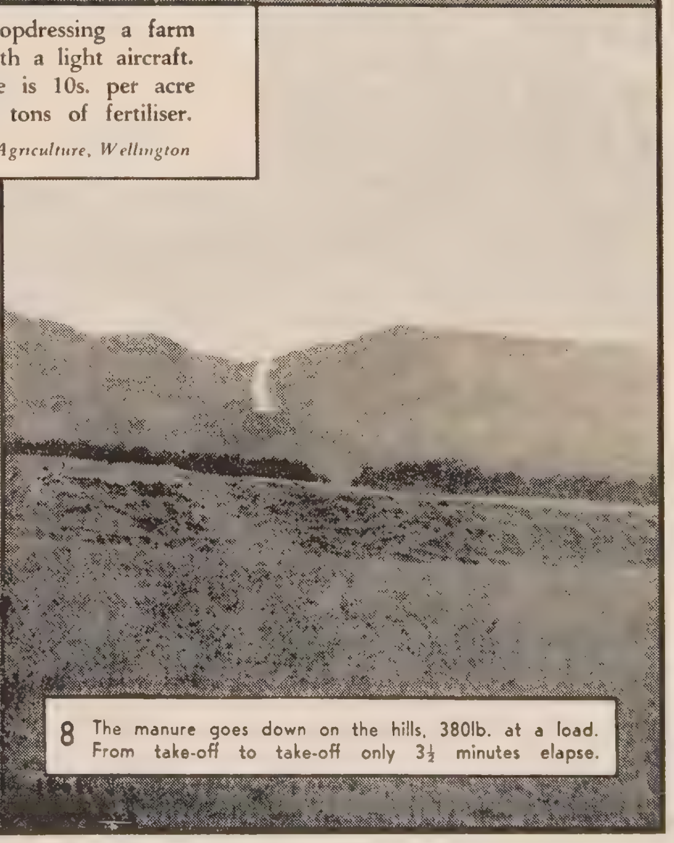
6 The pilot, who stays in his cockpit, prepares to take off with the load.

A pictorial record of a commercial company topdressing a farm in the Waitahora Valley, Dannevirke County, with a light aircraft. The distribution cost from farm gate to hillside is 10s. per acre and 100 acres per day are topdressed with 10 tons of fertiliser.

—*L. W. WOODS, Assistant Rural Economist, Department of Agriculture, Wellington*

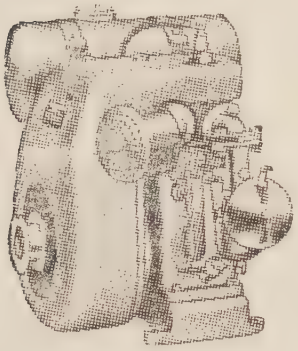


7 While the aircraft drops its load the farmers will reload the filler.



8 The manure goes down on the hills, 380lb. at a load. From take-off to take-off only 3½ minutes elapse.

Tough



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PASTURE AND CROP PRODUCTION

Cultivation of Land for Spring-sown Root and Green Forage Crops

Seasonal Notes Contributed by the Extension Division.

SOIL and situation are the deciding factors in determining whether the cultivation of grassland for root and green forage crops should be begun in late autumn or early winter or delayed until the spring. While the ploughing of light sandy soils in the higher-rainfall areas often may be left safely until a month or so before sowing, the cultivation of heavier soils, particularly in the lower-rainfall areas, should begin early enough to allow the old grass turf to rot and for winter weathering to assist seed-bed preparation.

* * *

DESTRUCTION OF TURF The three common methods for ensuring thorough rotting of thick turves before final seed-bed preparation are deep ploughing, skim ploughing followed by surface working and deep ploughing, and surface working of turf with discs or hustler followed by ploughing. In South Otago and Southland land for roots is usually ploughed out of old grass with a digger or semi-swamp plough in May or June to a depth of 6 to 8in. Where browntop is a common constituent of the old sward ploughing is often deeper and may bring up an inch of subsoil without detrimental results. Such early and deep ploughing allows the turf to rot and the winter fallow results in the weathering of the furrow slices and consequently lessens the cultivation work needed in spring.

* * *

SKIM PLOUGHING The turf of pasture land not infested with twitch can be rotted most thoroughly and quickly by skim ploughing in winter, followed by discing up the partially rotted turf just before deep ploughing in spring. As an alternative the land may be ploughed only once after the turf has been thoroughly broken up with the discs or hustler before ploughing.

* * *

SEED-BED The seed-bed for roots should be fine, firm, moist, and warm at the time of sowing. On all but light sandy soils early ploughing and a winter fallow are necessary to obtain these conditions. Time must be allowed for the turf to rot and the soil to weather and gain in moisture. Lime (where required) is usually applied at the rate of 1 ton per acre about 2 months before sowing, after the ploughed land has been double disced and harrowed. The final work of seed-bed preparation should take place in November when the usual work consists of 2 to 3 double strokes with the discs followed by a harrowing after each discing. Rolling or clod crushing after each harrowing may also be required and a final rolling or double rolling given before sowing to secure the necessary consolidation of the seed-bed.

* * *

SOWING WHEAT Main sowings of autumn wheat are made in May. In general the lighter the land and the more severe the winter to be expected the earlier the sowings should be made. The seed-bed for wheat should be fine and firm below with a rubbly surface which will withstand winter rains without setting. Too much surface cultivation, particularly after potatoes, peas, or rape, is harmful. The use of Certified seed is a guarantee that the line is up to a high standard of purity of variety and freedom from loose smut, a cause of considerable loss in many crops of uncertified origin. Sow Certified Mother seed for the production of seed crops and Certified Standard seed for milling wheat.

Left—Goat's rue covering a fence. Right—Fenceline cleared by the use of hormone weedkillers.

FERTILISERS FOR WHEAT Between 1928 and 1946 the Extension Division conducted 150 co-operative experiments on wheat manuring. These trials gave an average increase of 3.4 bushels for 1cwt. of superphosphate per acre. It is noteworthy, however, that whereas responses in the 1928-1933 period were on the average 4 to 6 bushels per acre, the average increase since 1940 for 1cwt. of superphosphate has been only 1 to 2 bushels per acre. This is probably due to the more widespread use of superphosphate for establishing and topdressing pasture land and the effect of the improved pastures in building up soil fertility. The use of 1cwt. per acre of superphosphate with wheat is still recommended, as the cost of this quantity is covered by an increased yield of 1 bushel per acre.

* * *

WHEAT ON LIGHT LAND The effectiveness of superphosphate in increasing wheat yields is more apparent on light land than on heavy land in good heart. For instance, on light land at Winchmore a response of 6.1 bushels per acre was secured in 1949. The light 30- to 35-bushel wheat land rarely carries a dense sward at the time of ploughing, nor does it receive topdressing fertilisers at the rate applied to heavier land.

* * *

ERADICATION OF GOAT'S RUE Goat's rue (*Galega officinalis*), a tall blue-flowered leguminous plant becoming woody when mature, is a serious weed of the Manawatu river-bed and adjoining lands. With every flood seed is carried on to pasture lands and from small beginnings the plant can rapidly cover the land unless it is eradicated. As goat's rue is both poisonous and very bitter, control with stock is not possible. Grubbing has been the only successful method other than two ploughings and cropping. Among the weedicides tried, hormone weedkillers of the 2, 4-D type have been disappointing, for though the top growth is affected by their use, the plants come away again from the strong, woody rootstock. Recent work, however, with hormone weedkillers containing 2, 4, 5-T alone, or in addition to 2, 4-D, has given promising results.

In a series of trials at Whakarongo and Opiki on areas where goat's rue has taken complete control, a weedkiller containing both 2, 4, 5-T and 2, 4-D has been very effective. Although two concentrations of the weedicide were used, namely 1 in 40 parts of water and 1 in 80, there were no visible differences in the degree of control. A good kill was obtained throughout.

The Symptoms and Control of "Pullet Disease" in Poultry

THE condition of poultry known as pullet disease, blue-comb disease, new wheat disease, or X disease has been known in Great Britain and America for several years. Its cause is unknown and it affects not only pullets but also older fowls and birds of either sex. Cases have been reported frequently in New Zealand during recent months, and in this article A. C. Howse, Poultry Veterinarian, Department of Agriculture, Christchurch, discusses the symptoms and effects of the disease and suggests measures to control it.

THE disease usually occurs in late summer and autumn, and the usual train of symptoms observed recently has included a sudden drop of egg production in laying pullets or yearling hens. So far cases have not been observed in birds older than yearlings this season. Often the disease has affected birds in only some of the pens on a farm, for no apparent reason, as feeding and management have been the same throughout. This corresponds with experience overseas.

Other Symptoms

In addition to the drop in egg production, other symptoms are shown by some though not all of the birds in the affected pens. These include loss of appetite, mopiness, blue or purple discoloration of the comb, particularly toward the tips of the serrations, and a full, prominently distended crop. The distended crop is such a constant and conspicuous feature of the disease that many poultry keepers conclude that it is the cause of the illness, but it is one of the effects. Emptying the crop by operation or otherwise does not bring about a cure.

Mortality varies according to the severity of the outbreak and is often quite low, the main effect being the prolonged drop in egg production.

Post-mortem examination usually shows intense congestion of the small blood vessels of the surface of the body, causing a dark discoloration which is very evident when the skin is removed from the surface of the breast muscles. This, with the scaly appearance caused by the congested capillaries, causes the so-called fish-flesh appearance.

The crop usually is full, often containing a large amount of fibre, with wheat or other grain. The carcass is often that of a bird which has been in full lay recently, with well-developed oviduct and numerous mature egg yolks. There may or may not be a deposit of white, powdery, salt material on the surface of the liver and other organs and on the inner surface of the breastbone. The kidneys frequently are engorged with grey urate deposits.

Control Measures

Recent cases have been mild, with a strong tendency toward spontaneous recovery—so much so that many owners, particularly backyard poultry keepers, have deluded themselves into believing that their own frequently rather startling concoctions have effected a cure. For example, one man decided that his birds had pneumonia and supplied the unfortunate creatures with a mixture of potassium permanganate, Epsom-salt, and kerosene in place of drinking water.

Most mild cases respond readily to a change of diet, even where the feeding system appears normal and satisfactory. Dry-mash feeding should be stopped, and wet mash to which 5 per cent. by volume of molasses has been added should be fed night and morning instead. Grain should be withheld and 2 per cent. of molasses should be given in the drinking water.

More obstinate cases which do not respond to this treatment may benefit from the administration of potassium salts, which, however, are in somewhat short supply and rather expensive. Poultry producers who want further information on this type of remedy should write to the Poultry Veterinarian, Department of Agriculture, Christchurch or Auckland.

Cause not Understood

The cause of this disease is not understood. Frequently its appearance has coincided with the feeding of a fresh consignment of mash, but attempts to reproduce the disease in laboratories and elsewhere by feeding suspected mash to other fowls have always failed. Attempts to transmit the disease by other means have also been unsuccessful.

Usually the condition can be recognised in the field by symptoms and post-mortem appearance alone. It might be confused with toxic heart disease, but the changes in the appearance of the heart characteristic of that condition are absent in pullet disease. Microscopic examination of sections of liver can provide laboratory confirmation, so in a doubtful case, or in any case as a matter of scientific interest, a few suspected live birds may be sent to the Animal Research Station, Wallaceville, for examination, after which a report and advice on the method of control will be sent to the producer.

Fruit Crop Estimates for March, 1950

THE following estimates of the fruit crop for March, 1950, in 000's of bushel cases, are provisional and revised monthly for the period November to March and are summarised from information supplied by field officers of the Horticulture Division, Department of Agriculture.

FRUIT	DISTRICT									
	Auckland	Gisborne	Hawkes Bay	Manawatu Wanganui	Wairarapa	Nelson	Marlborough	Canterbury North Otago	Central Otago	Total
APPLES—										
Ballarat	57	10	71	1	2	5	4	8	1	159
Cox's Orange Pippin ..	8	4	62	1	1	125	14	17	4	236
Delicious	36	11	82	1	5	180	14	18	23	370
Dougherty	21	5	62	—	—	24	1	—	—	113
Granny Smith	69	3	70	2	2	70	2	2	1	221
Gravenstein	26	—	35	—	—	60	1	—	—	122
Jonathan	11	—	27	—	1	264	23	12	7	345
Sturmer	6	5	150	5	15	335	24	49	15	604
Other varieties	102	5	130	4	4	147	12	54	16	474
Total	336	43	689	14	30	1210	95	160	67	2644
PEARS—										
Beurre Bosc	3	—	2	—	—	7	—	—	—	12
Louise Bonne de Jersey	1	—	10	—	—	—	—	—	—	11
Packham's Triumph ..	6	—	3	—	—	1	—	—	—	10
P. Barry	2	1	6	—	—	2	—	—	—	11
W. B. Chretien	9	—	37	—	—	26	—	2	8	82
Winter Cole	1	1	35	—	1	37	1	7	3	86
Winter Nelis	—	1	35	—	—	8	—	2	1	47
Other varieties	12	1	6	2	1	8	1	6	10	47
Total	34	4	134	2	2	89	2	17	22	306
OTHER FRUITS—										
Peaches	60	6	135	—	—	37	—	4	45	287
Apricots	1	—	4	—	—	—	—	.5	74	84
Nectarines	1	—	14	—	—	—	—	—	9	24
Plums	33	5	31	1	—	3	—	3	22	98
Cherries	—	—	1	—	—	—	1	3	9	14
Quinces	9	—	7	—	—	—	—	—	—	16

Pruning Bush, Standard, and Climber Roses

MANY amateur rose growers carry out the important operation of pruning with little knowledge of its principles and therefore do not get the results they desire. Garden lovers who are not familiar with pruning and those who contemplate planting roses this season will find this article by R. I. June, Orchard Instructor, Department of Agriculture, Hastings, a guide from which to work.

ROSES bloom over a long period, often lasting through the whole of summer and autumn, and there are few gardens, whether large or small, in which roses do not have a place. There are types—bush, standard, or climber—to suit almost any situation. One of the first steps toward giving roses the care which they deserve is to study the principles of pruning; the operation is not difficult provided the grower acquaints himself with a few simple rules. Once these are understood experience is the best teacher.

Reasons for Pruning

Roses must be pruned to maintain healthy and vigorous plants and to obtain flowers of good size, type, and colour. They must be kept open to light and air, which are so important in controlling the fungous disease mildew. Pruning is also necessary to shape the bush, so keeping it within bounds and of a tidy and balanced appearance.

Hard or Light Pruning

Whether pruning is to be hard or light depends on type and variety. Vigour is maintained by reducing the number of buds so that they receive the full benefit of food and moisture supplied by the root. If a few buds are left, they will throw strong growths, but where a large number of buds is left, each throws out growth which is weaker and the plant loses vigour.

Severe cutting makes the growth succulent and more subject to disease or damage in severe climates. Harder pruning is necessary to obtain larger and more perfect blooms such as are required for show purposes, but fewer blooms are produced. No definite rule can be laid down as to the amount of wood to be left; it depends on whether fewer and larger blooms are desired or whether the aim is more blooms to provide colour in the garden throughout the summer.

Weak and strong-growing varieties require different pruning treatment. It is advisable to study the growth of individual varieties and to apply the rule that weak growers require hard pruning, fairly vigorous growers medium pruning, and very vigorous growers only light cutting.

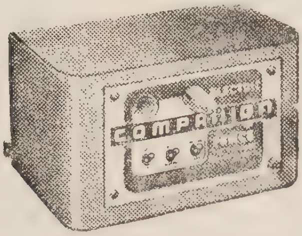
Pruning Tools

Because it makes the cleanest cut without the danger of bruising the wood, a sharp pruning knife is the best tool for making cuts, but it must be used skilfully. Well-sharpened secateurs are satisfactory and easy to use. A small, fine-toothed pruning saw may also be necessary on mature bushes for making cuts in heavier or harder wood. A pair of leather gloves for protection against thorns completes the pruning equipment.

Making the Cuts

The position of the cuts is important. First, buds must be located, which is quite easy on the top growth, as buds there are the first to swell and show as small knobs. The buds on the lower wood swell later and are sometimes hard to find, but close examination will reveal long scars across the wood where the leaves were attached the previous year; buds are immediately above these scars.

HEADING PHOTOGRAPH: Different types of roses used with good effect in a home garden. News-photo Service photo.



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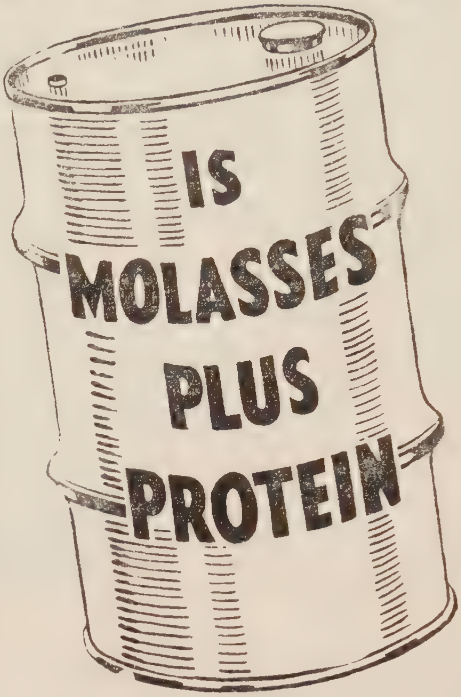

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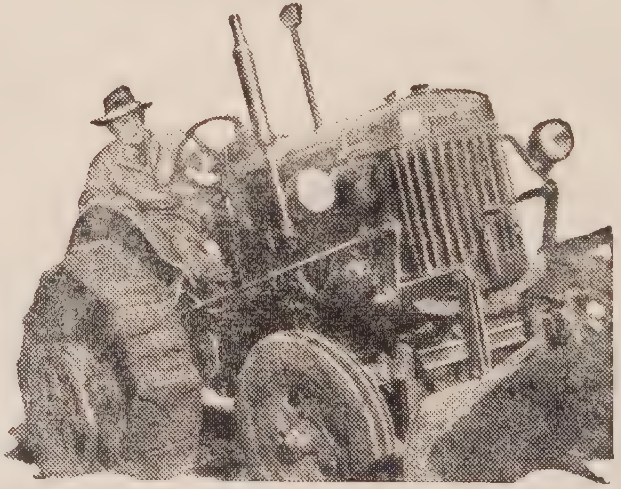

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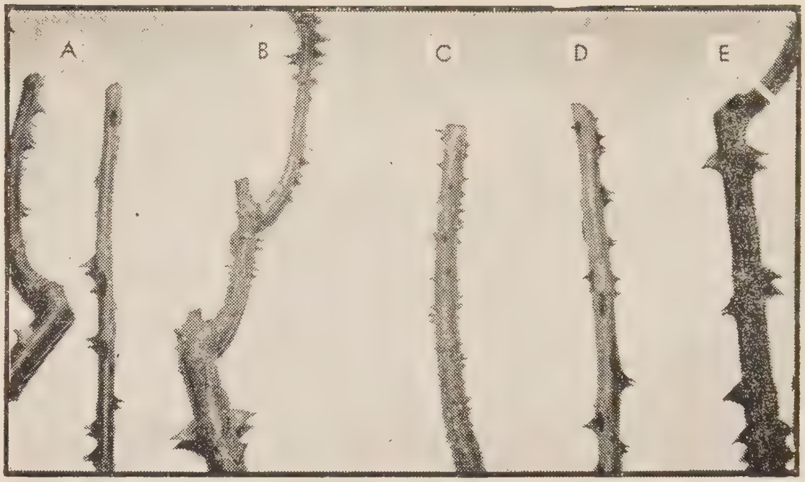
Where a knife is used place the blade opposite and about level with a bud and draw it across so that it comes out about 1/10in. or a little more above the bud (A in the illustration at right). If the cut is made too far above the buds, the wood will die back (B). This may encourage disease and also affects the appearance of the bush. The cut should always be slanting so that moisture will run off—avoid a flat cut such as C—but the slope should not be toward the bud, as the tip may die back slightly and allow moisture to collect round the bud (D).

A useful cut that can be employed quite often is shown by the white mark on E. Where a lateral growth has come away from a main stem and no bud can be found in a useful position close by, cut the lateral about ¼in. from the main stem. Growth will spring from the union of the lateral, even if no bud can be seen at the time of pruning. Two or more shoots may form at the union, but only one should be retained, the others being rubbed off when growth starts.



[News-photo Service photo

After-pruning Care

The recommendation about removing unwanted shoots where too many have developed can be taken a stage further. It is advisable to rub out those that are liable to produce growth in the centre of the bush, or shoots can be thinned out where too many have formed. This assists materially in keeping the bush reasonably open and throwing more vigour into the shoots that are left in good positions.

Pruning New Plants

All newly planted roses, except, perhaps, some of the climbers and climbing sports should be cut hard back. If climbers are cut too severely, it may tend to dwarf them; they may be planted as received from the nursery or tipped to a good strong bud. Bush-type roses should be pruned so that only a 3 or 4in. stub remains above the ground after the first pruning, and standard types should also be cut severely. Even if one bud develops on each stem from the crown, quite a well-shaped bush will be formed in the first year.

Roots of roses should be attended to before planting is done; any which are broken or crushed should be cut back into sound wood. A clean cut will callus over much more quickly than a rough or jagged one.

Shaping Bush and Standard Roses

Pruning cuts should always be made to an outside bud; that is, one that faces away from the centre of the bush as much as possible. Growth from these buds will tend to grow outward, leaving the centre open so that light and air can enter. All old or diseased wood and weak and crossing growths should be cut out, making the cut close to the crown or main stem. Four to 6 well-spaced, strong growths should be left as the framework of the bush and cut according to vigour. For newly planted and weak-growing bushes this will mean cutting to 2 or 3 buds from the base, probably the first showing on the outside of the plant. On stronger varieties moderate pruning—cutting to from 4 to 6 buds from the base according to the size of the growths, but not necessarily cutting all growths left to the same length—should be done. On very vigorous growers up to 18in. or more may be left. It is very difficult to keep some of the very vigorous types of roses from becoming too ungainly, but where an old or weak growth is cut out to the base new shoots will always develop for replacements.

Weeping standard roses, which are ramblers budded high up on the stock, should be pruned after flowering. Pruning consists of removing all tips that have flowered and any exhausted or weak shoots. Only new growths made in the current season should be necessary for the production of next year's blooms. These should be left uncut.

Bush and standard polyantha roses can be treated in much the same way as weeping standard roses unless they are to be kept dwarfed for bedding purposes. In this case they can be cut back in the winter at normal pruning time.

Climbing roses: After the first year the pruning of the climbing roses which belong to the hybrid teas, teas, and hybrid perpetuals is very simple. The long growths should be tied in a nearly horizontal position so that lateral growth will develop all along them. Do not tie the tips too low, as laterals will only grow up to the highest point of the arch thus formed. If they are allowed to go straight up, they flower only at the tip. The lateral growth can be cut back each year to 2 or 3 buds from the base of the main shoot. This can be repeated for a number of years if necessary, but any strong shoots coming up from the base can be trained to replace the main shoot at any time. If the shoots coming from the base do not develop as required, an old shoot that has flowered for several years can be cut right back. New and vigorous shoots will then develop.

Rose Species

Rose species vary a great deal—from dwarfs to very vigorous climbers; all have a place in the garden for their brightly coloured hips of various sizes, shapes, and colours. The weak dwarf growers should be cut back each year, but the stronger growers need only occasional thinning out; very vigorous growers should be cut only enough to keep them within bounds.

Time of Pruning

Though time of pruning varies according to climate, the work is usually done in August. In colder districts in the south it should be delayed possibly until September. This will delay growth long enough for young shoots to escape heavy spring frosts and cold winds. Where the climate is comparatively mild July pruning is satisfactory and some is done as early as June to bring the first roses into flower in October. There is no cause for alarm if the upper buds seem to be almost ready to burst into leaf—lower down they will be found to be still quite dormant.

If fewer but larger flowers are required, disbudding, which may be termed a form of pruning, is necessary. With most varieties the central bud will give the largest and best bloom. All side buds should be removed when quite small, if the bloom is required for show purposes.

It is as well to do a certain amount of disbudding in any case with hybrid perpetuals, hybrid teas, and teas. The operation can be carried out with a sharp knife or buds can be simply twisted between the thumb and forefinger.

The term summer pruning applies really to the taking of cut blooms or the removal of spent ones. It is an essential part of rose culture, as it keeps the bush in shape and throws better flower stalks for succeeding crops of blossom.

Where roses are taken for cut-flower purposes care should be taken to obtain a good long stem, which should be cut carefully just above a leaf stalk as in winter pruning. The bud at this point will throw out a strong shoot on which the next crop of blossom is produced. If spent blooms are cut off with only 2 or 3in. of stem, buds are not likely to throw such strong growth as when more stem is removed. Spent blooms should always be removed unless the decorative rose hips are desired. In all operations make clean cuts close to buds, main stems, or leaf stalks.

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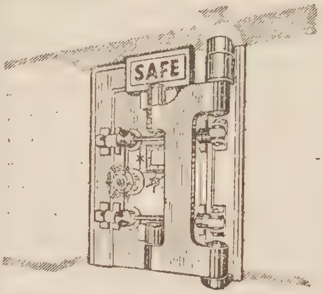

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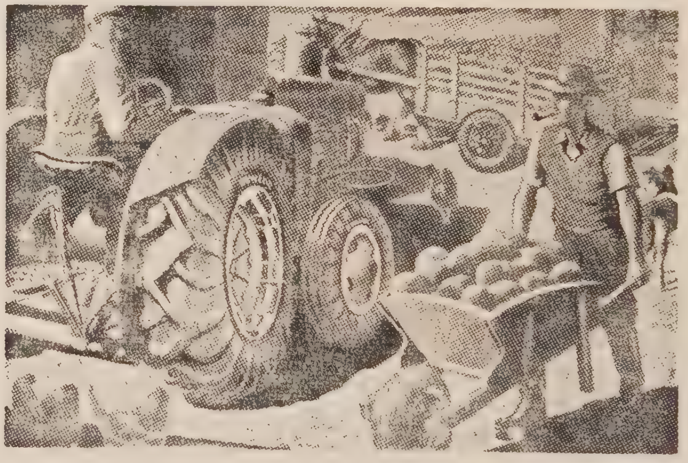

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Eradication of Foot-rot from Sheep Flocks

By H. DOYLE, Livestock
Superintendent, Department of
Agriculture, Christchurch.

OF the diseases affecting sheep probably foot-rot is the one best known to farmers. The condition is so common that many farmers now regard it as one of the evils with which they will always have to contend, and consider its treatment as part of the ordinary operations on the sheep farm. This idea is incorrect, as it has been proved that by adopting certain measures a flock can be freed from foot-rot infection.

The ewe in the foreground is shown in a typical attitude of sheep suffering from foot-rot.

SOME years ago a scheme for the eradication of foot-rot was evolved and has already been put into practice on certain properties in both Australia and New Zealand.

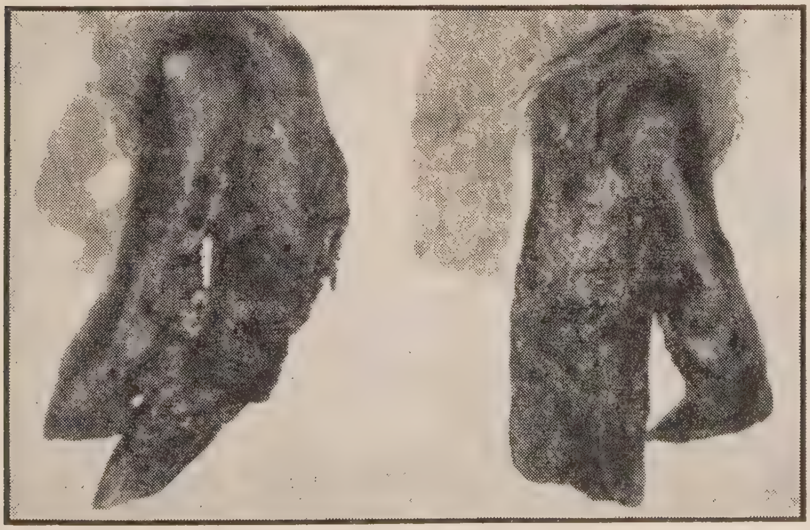
If the material loss which results each year from the action of this disease and the amount of work involved annually in attempting to keep the condition under reasonable control are considered, the question of eradication must make a strong appeal to the sheep farmer.

Diseases which bring about loss by death of the stock cause the farmer immediate concern, as he can readily assess the resultant financial loss. In such cases the chief aim of the owner, having treated affected animals, is to prevent infection of other stock and safeguard against further loss. The detrimental action of foot-rot, although more insidious, is nevertheless just as real. Until the fact that this a contagious disease is fully appreciated and appropriate steps are taken to deal with it as such, any effort made to control the condition can have little permanent result.

In former years the adoption of palliative treatment was to some extent justified, as it was then considered that the cause of foot-rot was an organism called *Fusiformis necrophorous,* which is found in most soils where domestic animals are kept. The distribution of this organism is so widespread that eradication of the disease was not regarded as a practical venture.

True Cause Now Known

As a result of research work carried out by Beveridge in Australia the true causal organism of foot-rot is now known. Infection with this germ alone usually results in mild cases, but typical foot-rot lesions develop in cases where this organism, together with another known germ, gains access to the tissues through abrasions or wounds in the feet of sheep.



Allowing hooves to become overgrown encourages the formation of cracks and separations between the wall and sole.

Predisposing Causes

Some injury or abrasion of the tissues in the space between the claws or cracks in the horn of the foot is necessary before the causal organism can gain entrance and bring about foot-rot. Such conditions can result from the irritation produced by long, rank pastures, and under muddy conditions grit and dirt may become lodged between the claws and so produce small wounds which may allow the entrance of infection.

Allowing the hooves of sheep to become overgrown encourages the formation of cracks and separations between the wall and sole. Wet seasons and damp, low-lying pastures (if sheep are kept on them for long) have a detrimental effect on the feet of sheep. The horn structure of the hoof may become weakened by the excessive moisture, and softening and even decay may result.

The above-mentioned conditions all tend to bring about a state of affairs in the foot which favours the entrance of the causal organism. However, they are only predisposing causes.

True foot-rot cases can develop only where the specific infection gains entrance to the foot.

It is known that the organism causing the disease may survive for years in the feet of affected sheep, but that it cannot survive apart from affected sheep for more than a few days. Experiments carried out in Australia indicate that the infection does not survive on pasture for more than 7 days. This discovery was of the utmost importance, as it made a plan of eradication possible. It will be apparent that paddocks which have been kept free from stock for at least a week can be regarded as being free from foot-rot infection.

ERADICATION OF FOOT-ROT

[*Sparrow Industrial Pictures Ltd. photo*

Each foot must be examined thoroughly, all diseased or loose horn removed, and a search made for possible pockets of infection.

The findings of the Australian research workers have been thoroughly tested in the field and it has been proved possible to eradicate foot-rot from affected properties.

Eradication Procedure

Before beginning an eradication scheme some thought must be given to the matter; also some arrangements must be made in advance to allow the scheme to be put into operation. Unless this is done there is little chance of satisfactory results.

The dry season of the year is the most suitable time to undertake eradication, as at this period the number of foot-rot cases is likely to be at a minimum. Paddocks which have been kept free from stock for at least a week must be made available. Provision must also be made for sufficient men to be available for proper examination of the sheep.

Examining Feet

On the day selected for operations to begin the feet of every sheep should be examined. All diseased or loose horn must be carefully but thoroughly removed and all under-run horn stripped. During the examination a thorough search should be made to discover any possible pockets of infection. Too much emphasis cannot be placed on this phase of the operation, because it is largely on it that success or failure of the scheme depends.

Lame sheep are not likely to be missed, but there are others which do not show lameness which may also be carriers of infection. These may go undetected unless thoroughly examined. Sheep showing a moist, hairless area of skin between the toes should be regarded as infected.

Sheep which after careful examination are considered to be free from infection should be separated from the others and put through a foot bath containing a solution of bluestone at a strength of 1lb. of bluestone to 1 gallon of water or of 2 gallons of formalin to 100 gallons of water. They should then be put into paddocks which have been spelled for at least a week.

Care must be taken to ensure that these sheep, after being through the foot bath, are not subjected to infection by travelling over paddocks recently used by other sheep before they reach the clean paddocks.

Treating Affected Sheep

The affected sheep and those regarded as suspicious should now be treated. The feet must be properly prepared before any dressing will have a beneficial effect. Thorough trimming of the feet and removal of diseased horn are essential in order to expose the affected structures to the action of the dressing. It should be remembered that the causal organisms develop best under crusts and dead tissue.

Under-run horn should be stripped in order to expose affected structures to the action of the dressing.

When the feet have been properly trimmed affected sheep should be put through a foot bath containing a solution of bluestone or formalin at a strength greater than that used for clean sheep. For treatment of the affected sheep the solution for use in the foot bath should be 3lb. of bluestone to 1 gallon of water or 10 gallons of formalin to 100 gallons of water. Ten seconds is a sufficient time to allow sheep in the foot bath. On emerging from the foot bath the affected sheep should be put into a paddock which for the sake of convenience can be named the hospital paddock; there they must be kept segregated from clean sheep. These affected sheep should be examined and treated at least once each week; preferably they should be put through the bluestone foot bath every 2 or 3 days.

Sheep which have completely recovered should be put through the bluestone foot bath and passed into a paddock where they can be kept in isolation. Again the feet should be examined each week. Those sheep which pass two examinations at weekly intervals and are found to be perfectly sound should be treated in the foot bath and returned to the clean mob. Should any sheep during this isolation period show signs of infection, they must after treatment be returned to the hospital paddock.

In the affected mob in the hospital paddock it may be found that even after repeated treatment a few sheep may be left which do not respond to treatment; these should be culled out and disposed of by slaughter, or some alternative means adopted to prevent them from infecting other sheep.

When the paddocks in which the affected and suspect sheep have been ultimately become empty they should be kept free from stock for at least a week to render them free from infection.

Fresh sheep brought on to the farm must be regarded with suspicion and should be submitted to the same careful examination and treatment as were carried out with the main flock. Until this has been done and the sheep found to be free from the disease they must not be allowed to mix with the clean sheep.

There is always a possibility that a carrier may have gone undetected and been allowed to enter the clean mob. Should this happen and the disease again make its appearance, all the sheep in that particular paddock should be examined and treated as before; the paddock itself should be regarded as contaminated and should be left free of stock for at least a week to render it free from infection before sheep are again allowed access to it.

By adopting this scheme foot-rot has been eradicated from some farms and this is possible on others.

After the adoption of intensive measures and attention to detail sheep scab was eradicated from New Zealand. The same could be done with foot-rot.

◆

Fire Hazards and Precautions on the Farm

EVERY possible precaution should be taken to eliminate likely causes of fire on the farm and to provide means of attacking an incipient fire before it becomes uncontrollable. This article by G. Dunnachie, Fire Protection Officer, Ministry of Works, suggests some safeguards which, though entailing expenditure, might reasonably be regarded as carrying investment value because of the increased safety they provide. These measures fall into two classes—fire prevention, covering precautions and the use of building materials which minimise chances of an outbreak and assist in confining it to its area of origin, and fire fighting, covering methods of dealing with outbreaks.

STATISTICS which would show the previous fire record of farm property in New Zealand are not available, but it is known that the incidence of farm fires is high, and few rural communities have not had to assist a neighbour at some time because of the ravages of uncontrolled fire. American statistics show that property destroyed in farming and rural communities accounts for nearly one-third of the nation's fire loss, and though that ratio would not apply in New Zealand, heavy fire waste is known to occur.

Nevertheless, the farm owner in general is like citizens in other walks of life—he has a sublime faith in his own immunity. That attitude might even be justified if fire were likely to result only from his own negligence, but he must consider the possibilities arising from acts of another person, who may be a workman with little sense of responsibility, a swagger with none, or even one of his own family.

The farmer's personal responsibility is even greater than that of the town dweller, for because of his isolation he is frequently required to carry out urgent building or electrical repairs in which any deviation from the soundest principles may result in the creation of a potential fire hazard. The city dweller can summon modern fire apparatus and trained men to his assistance by pressing a button, but in a similar situation the farmer is unaided. The destruction of a city home is a catastrophe, but destruction of farm property, in which business and home interests are combined, is even worse. The effect of the loss of a woolshed or tractor at a critical period of the year's operations might well be disastrous financially.

The Forest and Rural Fires Act, 1947, provides for penalties against persons lighting fires where they are likely to endanger forest land. It also requires county authorities to provide equipment suitable for extinguishing forest and grass fires and permits the enrolment of men for fire fighting during a state of emergency.

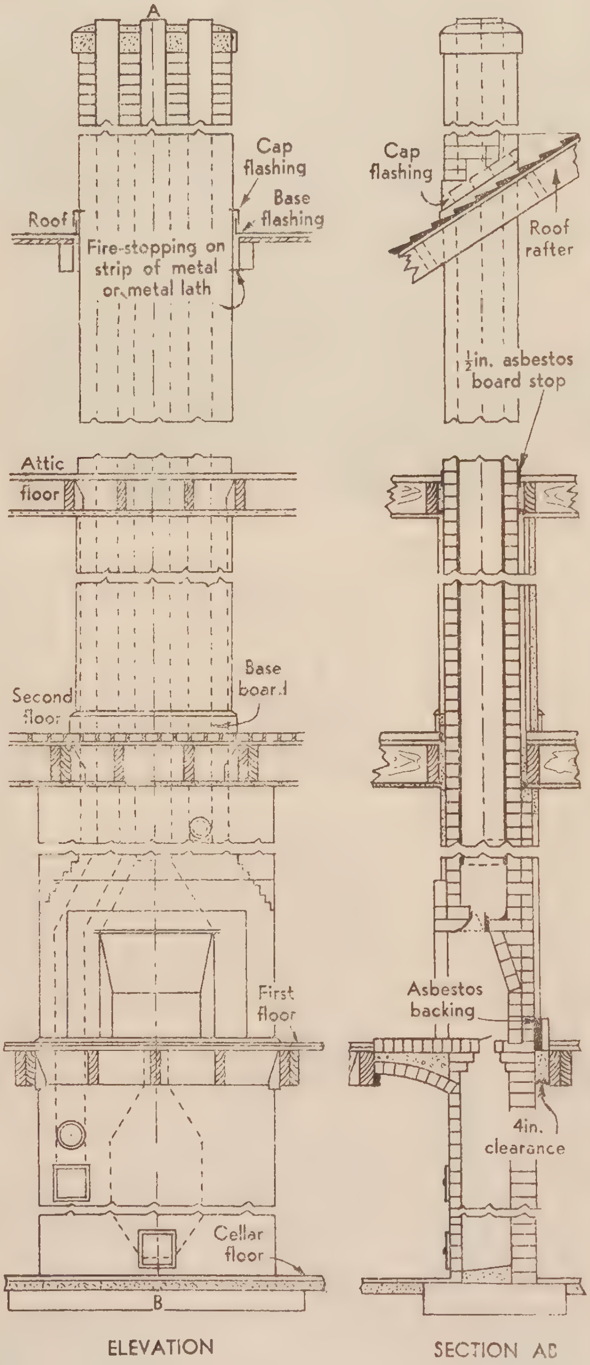
Fire-resistant Materials

Fire-preventive construction embraces the use of resistant materials, the spacing of buildings, and the safe installation of electrical, heating, and mechanical equipment. The preponderance of timber construction in New Zealand and the fact that little change may be expected in the immediate future make recommending the use of permanent materials rather futile. Nevertheless, the prospective farm owner might well ponder on the fact that a brick or concrete dwelling may be rehabilitated quickly even after the fiercest fire, but fire in a timber structure usually involves building from the ground up.

Probably the portion of a building most vulnerable to fire is the roof. Roof coverings of the asphalt and rag-felt roll type can propagate fire, be ignited by flying sparks, and quickly break down, ventilating and adding fuel to a fire inside a house. Recent developments have resulted in the introduction of more fire-resistant materials into roll roofing, and in some of them the very severe fire hazard associated with bituminised fabrics has been reduced considerably. However, a good roof will restrain a fire and a bad roof will develop and feed a fire, and for important buildings the use of permanent construction is recommended.

Heading photograph by "The Dominion."

FIRE HAZARDS AND PRECAUTIONS ON FARMS



Chimneys are notorious sources of fire risk. These diagrams show points of construction which, combined with good maintenance and frequent inspection, can reduce this hazard considerably.

Chimney Hazards

Chimneys are notorious sources of fire, and American statistics show defective chimneys as causing 12 per cent. of all dwelling fires in the United States. Sound initial construction, good maintenançe, and frequent inspection can reduce this hazard very considerably.

All chimneys should be built from the ground up, wholly supported on approved masonry or self-supporting, fire-resistant material. None of their weight should be carried by anything except their proper foundations, which should be at least 6in. wider all around the area of the chimney and should be started well below the frost line. Chimneys should reach at least 3ft. above flat roofs and 2ft. above the ridges of peak roofs.

Chimney walls must be at least 4in. thick, and thicker if they are of hollow tile or stone. Walls 8in. thick (two courses of brick) are preferable, as they give greater stability and minimise the possibility of cracks that might cause fire. Only cement or cement-lime mortar should be used. A standard flue lining should always be used unless the walls are at least 8in. thick and built of a refractory clay brick. Standard reinforcing rods should always be used.

A wall of a brick building may form part of a chimney if the walls of the chimney are bonded securely to the walls of the building and the flue is lined in the same way as for an independent chimney. A flue in a party wall should not extend beyond the centre of the wall, and its presence should be indicated permanently on both sides of the wall.

Floor joists or other woodwork should not be run into chimneys or flues, and wood casing, lathing, or furring should not be allowed within 2in. of chimney breasts. All floor timbers should be "trimmed" clear of the hearths and brickwork of the chimney so that they are not in contact at any point.

Regular cleaning of chimneys is essential to fire prevention. If proper brushes are not available, the old-time method of using a wrapped brick is next best. Burning out a chimney is hazardous and unsatisfactory; this method may bake the soot and leave a hard coating on the inside of the flue, and the heat generated may find a weak spot in the chimney and communicate itself to some external combustible. The burning of green wood leads to hard deposits, and regular sweeping is necessary to maintain the flue in a safe condition. Cleaning should be carried out at least once a year, or more frequently if that is indicated by the condition of the chimney.

After a severe earthquake the condition of the flue may be tested by lighting a smoky fire and blocking the chimney outlet with wet sacks. Fires have been caused by bad workmanship during the introduction of new smokepipes into flues, and skill and care are also necessary when blocking apertures after smokepipes no longer in use have been removed.

Spacing of Buildings

Time saved in doing the daily chores in and around farm buildings is a factor affecting farm income and accounting for the tendency to arrange them as compactly as is consistent with the operations of the farm. Against this must be weighed the possibilities of other buildings being ignited by radiated heat, flame, or flying brands from one which catches fire. The ignition of a timber building by radiated heat from a large fire such as a burning hay barn would be almost certain at a distance of less than 50ft., and may even occur at 100ft. or more.

Protection from grass fires may be provided by a strip of clear sod or a few furrows freshly ploughed at the season when such fires are likely to occur.

Spontaneous Combustion of Hay

The destruction of haystacks by fire is always a very severe blow to farm economy and management. Much technical and scientific information about the cause has been compiled, but the competent farmer who stacks his hay when it is in the right condition has little to fear from this danger.

Spontaneous combustion is a two-stage process. The first is the result of fermentation or other microbiological action, and the rise in temperature in the later stages is considered to be caused by oxidisation. It is thought that in the first stage products may be formed the subsequent oxidisation of which is a factor in causing ignition. Data compiled by the United States Department of Agriculture indicate that spontaneous ignition of hay is most likely between 2 and 6 weeks after storage.

When heating has been detected in hay the stack must be broken down or removed from the storage shed. However, the greatest care must be exercised, as the admission of oxygen when the hay is being uncovered is likely to result in ignition. Water for fire fighting should be in readiness and two or three persons should be available.

Dangers of Sodium Chlorate

Sodium chlorate is used on many farms for weed killing, and its fire potentiality is fairly well known as a result of fatal accidents arising from its use. By itself the chemical is noncombustible, but its oxidising properties are so great that it can promote ignition of other materials with almost explosive rapidity.

Precautions should be taken to ensure that no smoking or naked flame is allowed where this material is stored. Paper bags when emptied should be removed to a safe place and burnt. Great care must be taken to prevent sodium chlorate being mixed with combustible materials such as floor sweepings, as this union may ignite or explode spontaneously. A worker using the chemical should wear overalls and remove them to be washed before they can come into contact with possible sources of ignition. Ground on which sodium chlorate has been used is very vulnerable to fire, particularly during dry spells.

Weedkillers which do not create a fire hazard are calcium chloride and agricultural borax. Flame throwers enable weeds to be burnt off when vegetation is not dry enough to propagate fire beyond the area reached by the flame thrower.

Fire-fighting Equipment

Types of fires which may occur on the farm and for which provision should be made are those involving ordinary combustibles (such as timber and paper), electrical equipment, and burning liquids. For the first the jet of water remains the most effective extinguishing agent; carbon tetrachloride or carbon dioxide (CO_2) may be used on electrical equipment; and for burning liquids extinguishers of the CO_2 or foam type are suitable.

A jet of water may be provided by a 4-gallon bucket pump of the type used during the war. That this is an extremely effective unit is shown by the fact that by its use one of the larger city brigades extinguishes more than half of the fires it attends. Should the extent of the property justify greater provision, a pressure water supply, fed either by gravity or by pressure tanks, may be used to feed small-diameter hose. A pressure of between 40 and 50lb. per square inch feeding maximum lengths of 80ft. of ½ or ¾in. hose with a nozzle of 3/16 or ¼in. diameter will provide a continuous jet and an efficient method of combating a fire discovered at a fairly early stage.

["*Dominion*" *photo.*

A strip of clear sod or a few furrows freshly turned can help prevent scrub or bush fires from invading pasture land as this one is threatening to do.

The electrical fire hazard on a farm usually does not justify the provision of special equipment, but unusual circumstances may be safeguarded by carbon tetrachloride extinguishers of the quart size (the type frequently carried in motor-cars and buses) or 5lb. CO_2 units discharging an extinguishing gas. Discharges from both are non-conductors of electricity and are practically non-injurious to electric equipment, but the CO_2 type has the disadvantage of having to be returned to one of the larger towns for recharging.

Most farmers carry stocks of petrol, oils, and paints, and the possibility of a fire involving those materials cannot be overlooked. They should be stored in a shed separate from any major buildings, and if extinguishers are installed, they should be of the foam or CO_2 type. When mechanical equipment such as shearing machines is being used extinguishers must be kept handy, particularly when petrol tanks are being filled or motors started. At least one header harvester—a £2000 machine—became a total loss during the past summer through a fire which began when the engine back-fired.

Fire equipment is only of value when maintained adequately. Most extinguishers other than the gas-pressure type can be cared for by the farmer if he follows the maker's instructions carefully and keeps recharges on hand. One suggested method is to discharge the extinguishers annually on Guy Fawkes night, which, as well as dating the period, is also in keeping with the spirit of the anniversary.

Precautions in the Home

Finally, a few warnings about fires in the home:—

The person who enjoys that final smoke in bed before going to sleep is taking a chance for which many others have paid with their lives.

The use of petrol in the home near a source of ignition is equivalent to playing with a loaded shotgun.

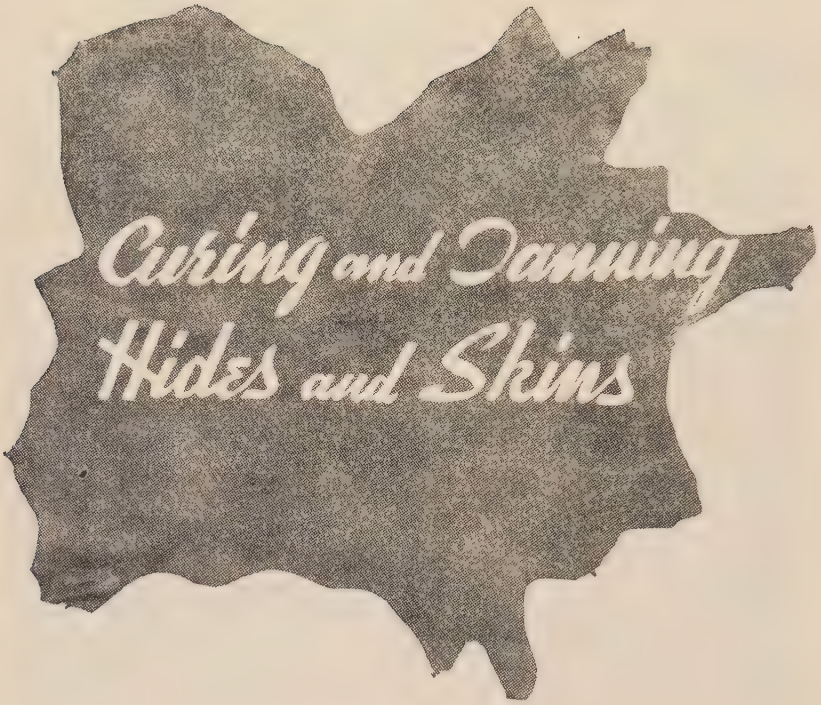
Airing clothes in front of open fires and leaving fires without guards may result in the family evacuating hastily and watching the home destroyed while they shiver in their night attire.

All lighting and heating equipment using inflammable oils has an inherent fire hazard which can be reduced only by careful use and correct maintenance.

Should a suspicion that the house is afire arise during the night, the safest plan is to make an exit through bedroom windows and then ascertain whether further investigation is needed.

This article covers only the minimum requirements which it is considered should be provided on every farm. In many instances the extent of the property to be protected will justify more comprehensive equipment than that outlined, necessitating further inquiry. It is believed that expenditure on fire equipment on the lines indicated is justified by the known facts.

Curing and Tanning Hides and Skins



CURED skins can be put to a multiplicity of uses, but skins of livestock and game killed on and about the farm are frequently left about and forgotten because farmers have no handy reference to curing and tanning recipes. This article gives a number of recipes for tanning and curing.

THOUGH a great deal of work is necessary, the following method is very good for tanning large skins. (It is, of course, good for small ones also.)

Soak the skin in warm water, stretch it, and thoroughly scrape the flesh side. Then apply a paste made of equal parts of saltpetre, borax, and glauber salts moistened with water; fold the skin, flesh side in, allow it to lie for 24 hours, and wash it in warm water. Next apply to the flesh side a mixture made by melting together 2oz. of good soap, 1oz. of washing soda, and ½oz. of borax. Fold up the skin and allow it to lie for 24 hours. In warm weather the skin will deteriorate if kept folded too long.

Make up a solution by dissolving 1lb. of alum and 2lb. of salt in a 4-gallon tin of hot rain-water or other soft water. When the solution has cooled to the point that it does not burn the hands put in the skin and allow it to soak for 12 hours; take it out, wring it, and hang it on a rope or riem for another 12 hours. This last soaking and drying should be repeated till the desired degree of softness is obtained. The usual stretching, rubbing, and twisting complete the work.

Hair on hides may be loosened by several different processes. One method consists of painting the hair side with a 30 per cent. solution of sodium sulphide thickened with lime. The skin is then folded up, hair side in, and left to lie for a few hours, when the hair can be removed by scraping. In another process (a cheaper one) the skin is immersed in a vessel containing milk of lime. The liquid is stirred daily, and after a few days the hair on the skin becomes loose. Wash the hide in several changes of cold water. Place it in water containing ½lb. of salammoniac or 1 gallon of vinegar per 50lb. of hide. Stir frequently and leave it overnight. Wash in cold water and then tan by applying paste as already described.

Sheep, Lamb, or Goat Skins

For sheep, lamb, or goat skins the following method is suitable:—

Make a strong lather with hot water and soap (but use it when cold) and wash the fresh skin, being careful to get all the dirt out of the wool. It is best to plunge the skin right into the lather. After being well washed the skin should be rinsed in clean, cold water. Next dissolve 1lb. each of salt and alum in 2 gallons of hot water (if the skin is very large it may take more water, but the proportions of the constituents mentioned should be maintained), soak the skin in the solution for 12 hours, and then hang it on a pole to drain, flesh inward. When well drained stretch it upon a floor or board to dry, stretching it several times during the process of drying. A good plan is to nail it wool downward so that the air can pass under the pelt.

Before it is quite dry sprinkle it on the flesh side with 1oz. each of powdered alum and saltpetre and rub this in well. If the wool is then found to be firm on the skin, the skin can be folded up and allowed to dry thoroughly, but it should be turned from day to day. Next scrape the flesh side with a blunt knife and rub it with pumice stone or fine sandpaper. Frequent stretching and working are essential to get the skin white and pliable.

To remove wool dissolve 1lb. of caustic soda in 2 gallons of water and add sufficient slaked lime to make a good thick paste. Apply this with a brush to the flesh side of the skin, fold the skin over lengthwise, wool side out, and leave it until next day; then pull the wool off the skin. Leather gloves must be worn when painting on the paste and pulling the wool off the skin, to avoid burning the hands. The skin must be thoroughly soaked in water shortly before the paste is applied, the degree of soaking depending on its dryness.

Calf Skins

To cure calf skins dissolve 12oz. of alum, 4oz. of salt, 4oz. of oatmeal, and 2oz. of saltpetre in a quart of water, rub the mixture thoroughly over the skin of the flesh side, and fold the skin flesh to flesh. Leave the skin for 3 weeks, turning it once a week. The skin should then be exposed to the wind and air until it is half dry, when any flesh should be scraped off and the skin should be pliable; dry it thoroughly. The skin is then fit for use.

Rabbit Skins

To cure rabbit skins mix sufficient bran and soft water to cover the skins, immerse them and keep them covered for 24 hours, then remove them, wash them clean, and carefully scrape off all flesh. Next take 1 gallon of hot water and dissolve in this 1lb. of alum and ¼lb. of salt. Cool the water so that the hand may be put in it. Immerse the skins for 24 hours and dry them partially by rubbing. Then immerse the skins for 24 hours in oatmeal and warm water, partially dry them in the shade, and finally rub them until they are dry. This leaves the skins like white leather and fit for use.

Making Greenhide Leather

The following method should be employed to make greenhide leather:—

After cleaning the hide and freeing it from hair by the ordinary process steep or paddle the stock in a solution of bichromate of potash and sulphuric acid (5 per cent. of chromate and 2½ per cent. of acid by weight of the wet stock). When this solution is thoroughly absorbed the stock should be a canary yellow throughout. Remove the stock from the bath and spread it out flat to drain overnight. Next immerse the stock in a solution containing 7½ per cent. of hyposulphite of soda (ordinary "hypo") and 2½ per cent. of sulphuric acid, again estimated on the original wet weight. When this reducing bath has completed its work the leather should be a pale green and should stand boiling without going hard or curling up. This latter test is a proof of well-tanned leather.

This leather dried out is known as chrome sole and can be made waterproof by impregnation with paffaffin wax. Care should be taken in the latter process to keep the wax at as low a temperature as possible while the leather is immersed.

Household Poultry: Catching and Holding Birds for Inspection

KINDNESS toward the birds is important in poultry keeping, because quietness encourages egg production. Frights should be avoided carefully at all ages, as they at least increase scariness in younger birds and probably reduce egg production in laying pullets. A severe fright is almost certain to induce an unseasonal moult and complete cessation of laying for several weeks. Sudden movements should be avoided. Quiet, phlegmatic, friendly birds give the best results. In this month's article for the household poultry keeper W. L. McIver, Poultry Instructor, Department of Agriculture, Hamilton, recommends that proper provision be made for catching fowls that require examination.

[Fraser Niederer photo.

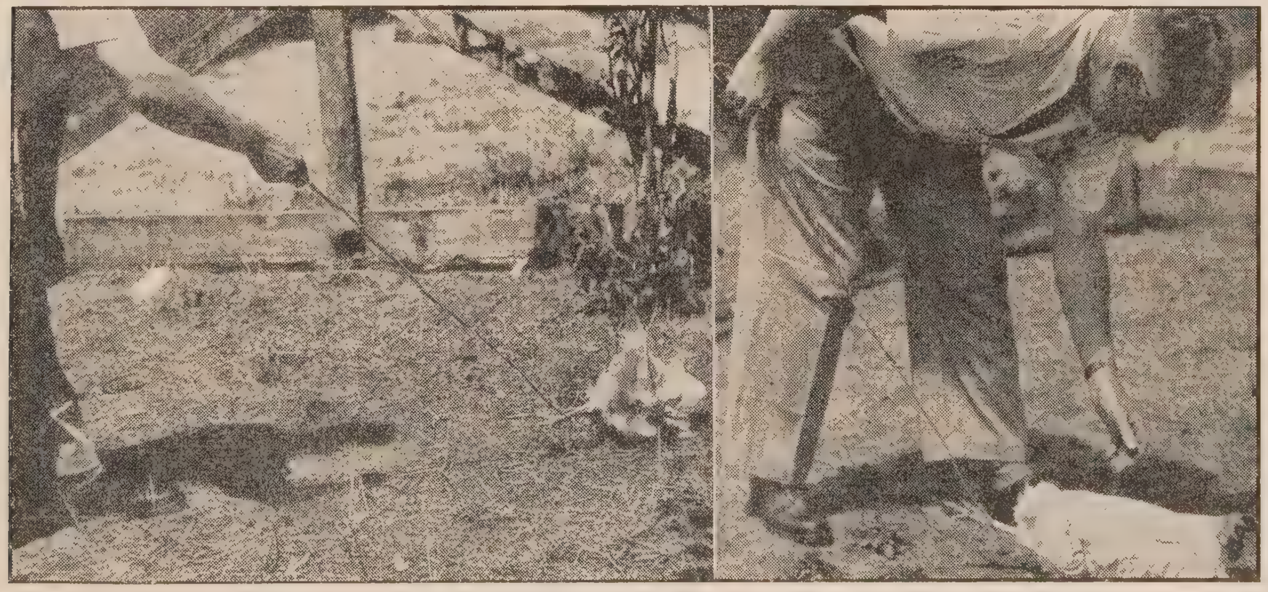
Taking advantage of a corner to catch a bird by hand.

ALL poultry keepers should make a practice of standing by quietly at feeding time and looking over the fowls carefully. Any that appear "off colour" should be caught and examined. Suspected poor layers can be examined at the same time, and quiet handling of the good layers is also advantageous, as frequent handling tames the fowls if done quietly.

At no stage should they be chased around the pen or run to be caught. The wanted bird should first be separated from the mob by being edged over to one side of the house or run or, better still, into a corner. Then, when it is clear of its flock mates, it may be caught quietly. Some device which ensures that the job is done with certainty and efficiency is better than bare hands for catching the bird as it runs out of the corner. Two simple devices commonly used are the wire hook and the net illustrated.

The hook is made of No. 8-gauge fencing wire. If the handle is too long it will bend, making catching more difficult. A sufficient length is 3½ft. even if it is necessary to reach under droppings boards, but if the fowlhouse is clear of obstacles, as it should be, a shorter length is more efficient. Many experienced poultry catchers prefer only 2½ft.

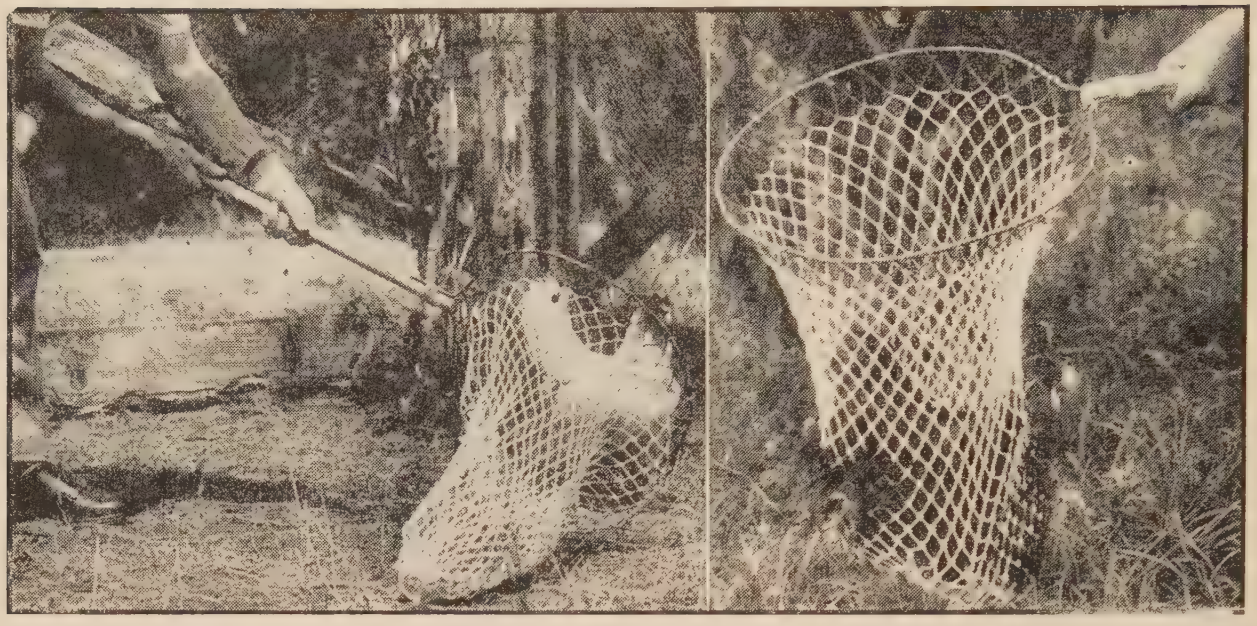
A wire-netting net is rather cumbersome, and after experience with it fowls become very cunning. They watch its approach carefully and learn to gauge just when to exert themselves fully to scramble out of its reach. A string net can be held inconspicuously behind the back and brought into action only when required. It should be deep enough in the bag to snare the bird completely and prevent it from struggling out. An argument between poultry keepers about the respective merits of hook and net may be humorous, but use of either requires practice and quite a degree of knack. A person experienced with one is likely to find fault with the other.



[Fraser Niederer photos.

Using a home-made catching hook. The bird is brought close to the feet before it is gripped.

CATCHING AND HOLDING A FOWL



[*Fraser Niederer photos.*

Using a catching net. A deep net prevents the bird from jumping out.

The art in using the hook is to catch the bird as it is running away. Catching a fowl with a hook when it is running toward the catcher is almost impossible. A right-handed catcher will find hooking the fowl far easier when it is moving from his right side toward the left.

The net is not used as it would be in catching butterflies. That type of action and indiscriminately rushing in among the birds must be avoided. The fowl should be edged against one wall away from its flock mates and, as it runs, the opening of the net thrust in front of it so that its own momentum carries it into the net. A turn of the wrist enmeshes it and enables the net to be lifted.

Practice will permit the catcher to net the bird whether it is running, standing still, or flying, on the ground, on the perches, or in the air. The net provides the safest way of catching all birds, especially young pullets, as it never causes broken legs, which sometimes happens with the hook.

The bag of the net should be about 2ft. deep, but the handle need not be long. A 2½ft. handle and a hoop of 15in. diameter allow ample reach.

For catching a larger number of birds the hinged frame for use in a corner is ideal. Another excellent device is a coop which can be placed outside the trapdoor leading to the run and into which the birds can be driven.

A bird will try to escape no matter what catching method is used, so it should be gripped quickly when it has been snared. Holding it for a short time by one leg or wing, or even by the neck, is not harmful, but as quickly as possible the fowl should be prevented from struggling and transferred to one hand so that the keelbone and weight rest on the palm. Two or three fingers passed between the legs enable both legs to be gripped firmly with fingers and thumb. Talking to the fowl and petting it encourage confidence. Before long the birds will become so accustomed to being caught that they will allow themselves to be picked up from the floor without running away.

Talking to fowls cannot be overdone. Actions which otherwise would scare them will not even cause a flutter if they are first warned by voice to be on the alert. Especially when approaching a fowlhouse where the birds cannot see clearly and easily who is coming, the poultry keeper should talk, or sing or whistle a signature tune, as a warning.

◆

METEOROLOGICAL RECORDS FOR MARCH

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
				Absolute maximum and minimum					Maximum fall		
		Approx. mean	Difference from normal	Maximum	Minimum	Total fall	No. of days of rain	Difference from normal	Amount	Date	
Kerikeri	201	64.6	+ 1.2	82.0	38.5	0.45	5		0.24	26	207.0
Auckland	160	65.0	+ 0.1	78.3	47.3	1.28	8	— 1.91	0.33	9	214.8
Tauranga	10	63.0	+ 0.5	82.2	40.1	1.32	9	— 2.75	0.35	9	245.1
Ruakura	131	59.1	— 2.7	77.6	35.7	1.01	6	— 2.09	0.31	11	216.4
Rotorua	980	59.2	— 0.7	81.0	33.0	0.82	7	— 2.75	0.36	10	
Gisborne	12	61.8	— 0.3	84.1	35.8	1.48	11	— 2.20	0.53	12	192.9
New Plymouth ..	160	59.8	— 1.2	73.6	40.4	1.31	6	— 2.35	0.49	26	209.9
Napier	5	62.0	— 0.3	84.9	40.7	0.15	4	— 2.52	0.06	11	213.3
Taihape	2157	55.8	— 0.8	74.6	35.0	1.18	7	— 1.25	0.52	11	
Wanganui	72	60.4	— 0.7	75.0	43.6	1.04	6	— 1.38	0.38	26	202.5
Palmerston North	110	59.1	— 1.2	78.0	36.8	1.47	9	— 0.92	0.62	11	173.1
Waingawa	350	57.8	— 1.0	79.5	31.9	1.51	10	— 0.50	0.66	11	208.8
Wellington	415	58.3	— 0.9	75.6	43.0	1.39	6	— 1.64	0.65	11	192.4
Nelson	24	60.2	+ 0.0	75.8	36.1	0.15	5	— 2.78	0.06	26	237.8
Blenheim	12	60.0	— 1.3	84.5	33.9	0.39	4	— 1.32	0.35	11	229.9
Hanmer Springs ..	1225	55.6	— 0.6	83.5	31.0	2.25	9	— 1.19	1.20	11	189.0
Christchurch ..	22	57.8	— 0.2	83.6	37.9	2.74	11	+ 0.78	0.99	11	164.9
Ashburton	323	56.6	— 0.7	84.0	31.5	2.36	10	+ 0.17	0.93	11	153.2
Timaru	56	55.4	— 2.0	80.8	30.6	2.21	11	+ 0.02	0.61	2	146.7
Alexandra	520	56.8	— 0.5	83.2	30.6	0.61	10	— 0.54	0.15	17	
Taieri	80	54.2	— 1.0	83.8	32.0	1.72	15	— 0.54	0.44	26	135.3
Invercargill ..	32	53.4	— 0.8	81.5	33.0	3.07	23	— 1.30	0.63	7	131.2

Farming Methods on the Canadian Prairies

PROBLEMS associated with farming on the vast Canadian prairies are discussed in this article by R. Thaine, of the Dominion Experimental Station, Swift Current, Canada, and formerly Assistant Fields Instructor, Department of Agriculture, Blenheim. The author describes the methods employed on the extensive grain farms and cattle ranches, and explains that the present aim is to stabilise the agricultural economy of the Dominion.

The type of farm home and buildings seen on the prairies. Insulation and heating are the important features of farm buildings.

CANADA is one of the bread baskets of the world, and claim to this fame is made possible through the production of Manitoba, Saskatchewan, and Alberta, the three prairie provinces. Although wheat is the mainstay of the agricultural economy of the prairies, other avenues of production are used to great advantage. The vast area of open land has presented many difficulties to the pioneers who came west only 80 years ago. Chief of Canada's resources has always been her agricultural and pastoral lands, and the wealth of the west is completely dependent on them. During the last 20 years discoveries of new natural wealth such as oil, gold, and uranium deposits have been made, coal is being mined, and the timber of the northern areas is gradually receiving greater attention.

However, without the farming industry the prairies would still be a land of remote outposts. It is difficult for a person who has lived among hills and valleys to become adjusted to this wide expanse where only low rolling hillocks interrupt the continual unfolding of mile upon mile of level prairie.

Although the outsider tends to think of the prairie provinces as one big area of prairie land, the types of conditions under which agriculture is practised are quite variable. At the American border the land is of the short-grass grazing type, but with some exceptions the soil types and moisture conditions improve gradually as latitude increases. There are areas of rich cropping land, of which the heavy clay soils of Regina Plains may be considered typical. Then there are the transition regions of mixed farming, which are gradually replaced by the grey-wooded soils of the far north. Agricultural practice in these last-named regions is confined to the utilisation of small, isolated areas.

The agricultural production of the west is primarily noted for grain (mainly hard wheat) and beef. As a rule grain lands occupy the better soils in areas of fair rainfall, while ranching, utilising the native unimproved pasture which has developed under very low moisture conditions, is carried on throughout the range country. This latter class also includes areas of higher precipitation where soil and topographic conditions make cultivation impracticable. In addition a pig-raising industry is supported as a sideline to grain production and provides another form in which western grains may be marketed. The following statistics (1946 figures) give some indication of the productive capacity of the prairie provinces:—

Livestock	**Total**
Horses	1,451,000
Milk cows	1,205,000
Other cattle	3,412,000
Sheep	1,644,000
Pigs	2,238,000
Crop areas	**Acres**
Wheat	25,000,000
Oats	9,610,000
Barley	6,269,000
Rye	460,000

Forage crops, which are used mainly as hay, are also grown in considerable quantities. The most important species is lucerne, there being a total of 684,000 acres in 1946, and this area has been increasing steadily. Provision of winter feed is a continual problem to many stock owners and a most important consideration to the livestock industry. The growing realisation of the value of forage crops is resulting in their playing an increasingly important role in the agricultural system of Canada. Small-seed production is carried on to a limited extent in the Park Belt area, where increased precipitation and decreased evaporation provide suitable conditions. Lucerne, red clover, rape, and white clover comprise the range of seeds produced.

Grain Farming

Grain farming is practised to some extent in all but the most arid regions, and the management of prairie farms is greatly dependent on the grain

Irrigation reservoir at Val Marie, Saskatchewan, which services one of the smaller projects in western Canada.

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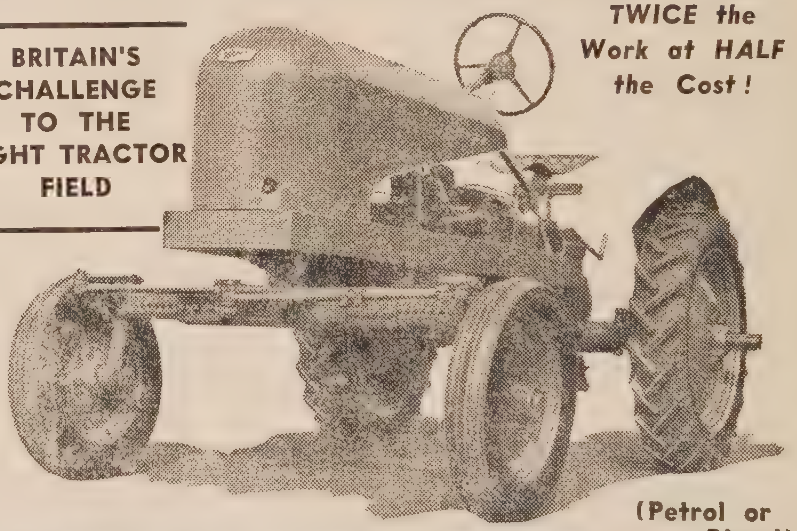

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A section of the field crop experimental plots at Swift Current, Saskatchewan. The experimental station is administered by the Dominion Department of Agriculture.

land-pasture ratio, which is in turn determined by rainfall and soil type. The cultivated land may be used either for grain production or as summer fallow in preparation for a crop to follow.

The proportion of summer fallow to cropped land is an important consideration in all management programmes.

On the lightest marginal cropping lands the proportion may be one-third crop to two-thirds summer fallow, and proportions range through to three-quarters crop to a quarter summer fallow. Even on the best of cropping land the benefit of the summer fallow for weed control, moisture conservation, and fertility restoration is fully realised. With only a 7 to 15in. summer rainfall, moisture conservation and maximum utilisation are major factors in cultural practices. It has been found in moisture studies that it requires ½in. of rain to produce one bushel of wheat. Thus, under a 7in. rainfall, 14 bushels is the average yield, though, of course, rainfall distribution throughout the season plays a great part in the utilisation of moisture.

The advent of mechanised farming caused the greatest possible advance in grain farming. On the prairie, where the wide open spaces lend themselves to big machines, power farming has developed and expanded to the fullest extent possible. On grain farms there is practically no hand work, farming operations consisting mainly of long hours of tractor work in spring and autumn. Most operators leave the farms in winter to live in a nearby town, the more fortunate moving to the warmer south. Grain farming extends from the smallest area held as a sideline to units of thousands of acres, where the basis is one of big business. In Canada an amazing number of people are land owners; people from all walks of life invest in land of some description, hoping for big crop returns in the season ahead and consequently a dividend on all investments.

Ranching

With ranching, production is a little more stable than in grain farming, but until the last 6 or 7 years the market situation for cattle was just as unpredictable as that for wheat. The main ranching areas of the west are in southern Saskatchewan and in the south and west sections of Alberta, which is the province most noted for beef production. There the Hereford breed has become a tradition in the industry. Beef production is also part of the mixed-farming system, but on mixed farms the Shorthorn is the popular breed and production methods are more haphazard, being a far cry from the highly organised ranching industry.

Ranching is strictly an extensive utilisation of native grassland. The holdings are large, some, such as the McIntyre ranch, being renowned for their tremendous areas.

The Hereford breed, because of its noted hardiness, can be wintered on the range quite satisfactorily in normal seasons. Winter feed, usually of quite low quality, is provided and the aim is to maintain the animals in store condition so that production growth can be made in spring and summer. Very few ranches set out to fatten their stock, but rather sell them to feed-lot operators, generally as 2-year-old heifers and steers. Sales are made in the autumn so that stock numbers are at their lowest through winter months.

Grain elevators are a common sight on the Canadian prairies. Grain is trucked in bulk to the elevators and from there goes by rail to the lake head for shipment overseas.

Today the ranching business is in a better financial position than at any other time in the history of the industry. In the past 2 years prices have ranged between 15 and 20 cents per pound, which makes a prime steer of 1000lb. worth $200.00 or about £65 to the rancher.

Labour and operation costs have risen as in many countries in the world, but by no means are they in proportion with the price rises.

Conservation Programmes

The feeling for the need of conservation in agriculture is realised by the administrative bodies in Canada and work is being done to ensure more stable and more attractive conditions for those on the land. As in almost every country in the world settlement in western Canada involved much hard work, but there was little knowledge of the basic factors which were to determine success or failure. Consequently, much of the land "homesteaded" proved unfit for a cereal-grain economy and today there are thousands of acres of abandoned farm lands and many more thousands of acres where farmers are barely able to carry on. The position was aggravated during the last decade, when seven of the worst drought years were experienced. To relieve the situation the Prairie Farm Rehabilitation Act was passed and an organisation set up for the administration of the Act, a function which it has carried out since 1935.

FARMING ON THE CANADIAN PRAIRIES . . .

The policy of the P.F.R.A. is based broadly on conserving moisture, soil, and feed. Extensive community pastures have been reclaimed from abandoned farm land so that farmers may be encouraged to avoid over-grazing in periods of shortage. At all times stock may be pastured on community areas at a nominal charge. Much stress is placed on the conservation of moisture by way of the summer fallow, because where weeds are destroyed efficiently 35 per cent. of a year's rainfall can be stored for the use of the crop the following year. Much more moisture can be saved by this system than could be provided through irrigation.

During the dry spell of the "dirty thirties" farmers in western Canada had a taste of what serious wind erosion might do to their agricultural lands. Much has been learnt about farm practices which will prevent erosion and investigations have resulted in the development of a farming programme which is conducive to keeping the soil on farms. In the control of wind erosion the following have proved important: Use of the one-way disc plough and the Noble blade; strip farming; the maintenance of a surface trash cover; and weed-free farming.

The problem of moving people from farms on marginal lands to areas where fair reward for their labours might be expected is another problem tackled by P.F.R.A. The main hope for success in this field is placed in irrigation. The proposal is to move farmers away from the poorer-quality lands of the west and to settle them fairly intensively on economic units of irrigated land. It is thought that it will be possible eventually to irrigate 2,000,000 acres of prairie lands, but such a programme will take many years to complete. However, the work is well under way and one large project involving the irrigation of 500,000 acres has reached an advanced stage. Irrigation will always be a minor phase of prairie agriculture, but should prove an invaluable supplement to a dry-land economy.

Soils on the prairie are distinctly neutral, showing no acidic nature, and heavy concentrations of calcium salts are to be found on low-lying areas throughout this country. Prairie soils have developed under arid to semi-arid conditions which have not allowed any excessive leaching to take place. Soil formation on the prairies was brought about by glacial action on parent rock transported from the region of the Rocky Mountains.

In most cases washing of the surface soil has occurred, resulting in the formation of a calcium salt layer between 6in. and 2ft. from the surface. Where irrigation has been practised these salts have in certain areas seeped to the top inch or two, preventing normal growth and giving rise to a serious problem. Soils are classified generally into light brown, brown, transitionary, black, and grey-wooded types. Quality improves as soils pass from light brown to black; grey-wooded soils are not suitable for agricultural use until developed by cultivation and the use of fertilisers.

Soil types range from coarse sand and gravelly types to heavy clay. Although the latter are the most difficult to cultivate their ability to hold moisture makes them the most valuable farming lands for wheat production. Good, heavy clay lands capable of producing 30 bushels of wheat per acre have a present nominal value of $70 to $90, or about £22 to £29, per acre. Fertility of most soils is high, with moisture the limiting factor in crop production.

Climatic Conditions

The continental climate experienced over the prairie to a great extent influences agricultural practices. Farmers have to contend with severe winter conditions for several months and summer brings hot, dry weather, which in some districts makes successful farming a real battle. Spring and autumn are very short seasons. Extremely cold weather and sub-zero temperatures can be expected for 5 months, while highest temperatures are recorded in July and August. Livestock must have supplementary feeding through the cold period and this has led to the widespread development of stall feeding. Most of the rain falls during the summer months of June, July, and August, but areas have been known to have had no rain for 2 years. On the other hand northern farming districts usually have ample moisture to produce good crops.

Rehabilitation of Ex-servicemen

Land for the rehabilitation of returned servicemen has been more plentiful in Canada than in many of the other allied countries. Any returned man wishing to get on the land has had the opportunity. In most cases conditions are such that success is dependent entirely on the individual. Some of the land used is not of the best quality, but care has been taken to ensure that each man is placed on an economic unit which shows greater than average prospects of success. The Department of Veteran Affairs has offered thousands of ex-servicemen a higher education, and many have taken the 4-year course required for an agricultural degree.

Production and land utilisation have reached a limit in western Canada under present agricultural methods, with the exception of the use of irrigation, which is likely to promote a certain amount of improved utilisation. The area which might be irrigated is very limited, and in terms of dollars production will not expand greatly through irrigation.

The prairie provinces contain large areas of marginal and sub-marginal lands, but it is doubtful if development of them would yield worthwhile results. The aim of thinking farmers and agricultural workers in western Canada today is to stabilise the agricultural economy at its present level. The work to be done is largely conservation, not expansion, and the aim is to introduce into farming methods as much diversification as possible to create a healthy and permanent agricultural system.

Journal of the British Grassland Society

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CONTENTS OF VOL. 4, No. 2, 1949.

1. The grassland of the west of Scotland. Robert Laird.
2. Vegetation changes in hill grazings with particular reference to heather (*Calluna vulgaris*). E. Wyllie Fenton.
3. Some grass species of Ethiopia. A. T. Semple.
4. Cold storage of pasture used in digestibility experiments. W. F. Raymond, D. E. Eyles, and V. G. Caukwell.
5. Note on the technique of sampling soil to determine the content of buried viable seeds. Stella S. Champness.
6. Research and Problems Overseas.
7. Reports and Notices of Meetings.
8. Book Review.
9. Financial Statement.

This Journal is published quarterly. Subscription: Vol. 1, 10s.: annual subscription thereafter, 20s. Orders to Secretary, British Grassland Society, Agricultural Research Building, Penglais, Aberystwyth, Wales.

BOOK REVIEW

"The Pig Industry": W. Deutsch

A NEW edition of "The Pig Industry," by Walter Deutsch, which is one of the "Profitable Farming" series of books produced in Australia, is enlarged to 400 pages by the inclusion of chapters on the marketing of pigs and on trade requirements. The additions serve to round off the publication as a handbook for Australian farmers or students of pig keeping.

All aspects of production, breeding, feeding, and management, including disease control, are well covered. A directory of Australian pig studs is included as well as appendices dealing with butchering pigs on the farm, judging of carcasses, feeding standards for pigs under Australian conditions, and useful types of breeding record. A comprehensive index of subjects provides a means of ready reference.

It must be realised that the book is written primarily for Australian conditions, and while much of the information on breeding and general management will be applicable in New Zealand, sections on feeding, particularly where quantities and costs are mentioned, do not have direct application because of the different economic conditions.

The book is well produced and is worthy of a place in the library of anyone interested in primary production under Australian conditions.

—A.L.

"The Pig Industry," Associated General Publications Proprietary Ltd., 26 Hunter Street, Sydney. 24s. (N.Z. price).

Blackleg in Sheep

By I. M. CAIRNEY, Veterinarian,
Department of Agriculture, Dunedin.

FOR many years blackleg has been recognised as a frequent cause of death in young cattle in certain districts in the North Island, but only during the last few years has it been recognised that blackleg is responsible for the death of a considerable number of sheep in many of the best sheep-farming districts. Blackleg in sheep and in cattle is the same disease, being caused by the bacterium *Clostridium chauvoei*. This article discusses blackleg in sheep, particularly its practical aspects, and describes the methods by which the farmer can prevent losses from the disease.

SHEEP which contract blackleg seldom recover, but generally die within a very short time, so that symptoms are rarely observed. Occasionally, however, an infected sheep is noticed before it dies, and the following symptoms can then be observed: The infected animal becomes separated from the flock, it ceases to graze and does not chew its cud, and it has a thoroughly dejected appearance; lameness is sometimes present. Soon after reaching the stage described the animal becomes cast on its side and its breathing becomes fast and increasingly laboured. Death follows rapidly.

Appearance of Carcass Soon after Death

Careful examination of the carcass as soon as possible after death is of the greatest importance in determining the presence of blackleg infection. However, the findings of such an examination should be proved by forwarding suitable specimens to the laboratory of the Department of Agriculture's Animal Research Station at Wallaceville for confirmation of the cause of death. (This will be considered in more detail later in the article.)

Frequently bloody froth will be seen at the natural body openings, but this does not necessarily denote blackleg and must not be regarded as proof that it was the cause of death.

[*Neuline Film Studios photo.*

To reduce risk of blackleg infection ewes should be lambed, wherever possible, on paddocks where losses from the disease have not occurred.

Vaccination is by far the most effective means of minimising losses from blackleg.

The next stage of the examination is to pluck or skin the carcass. During plucking or skinning it is necessary to observe most carefully, because definite evidence of blackleg may be present.

Look for areas of muscle (flesh) which are very dark in colour—nearly black. These areas can be differentiated from a bruised area, the appearance of which is only too familiar to most sheep farmers.

The black parts may vary in size from quite small areas to extensive ones and sometimes may involve a quarter or more. Their location also varies considerably. If wounds, such as those which may occur at shearing or crutching, are present, the black areas will be close to the wounds. If death has occurred a few days after lambing, the black areas will be present in the vicinity of the external opening of the genital passage and under the tail. Where a sheep has died and has no wounds or where death has not followed soon after lambing the black area is most commonly found on the quarters, shoulders, and sometimes on the jaw or neck.

Frequently the dark area has gas formation through the tissues; this may give it a bubbly appearance and if a finger is passed over it, has a characteristic feel somewhat similar to creased brown paper. There is also a smell which might be described as half-sour and half-sweet. This smell is characteristic but difficult to describe. The conditions associated with blackleg, once experienced, are readily recognised. They are not likely to be confused with normal putrefaction, bruising, etc., if the examination is carried out as soon as possible after death. Of course, if examination of the carcass is delayed, putrefaction destroys the evidence, and very rapid putrefaction is a feature of blackleg.

There is a further difficulty. Occasionally the carcasses of sheep which have died from blackleg infection show none of the conditions already described. This emphasises how necessary it is to confirm a diagnosis by forwarding specimens to the Wallaceville laboratory.

The appearance of blackleg is almost identical with that commonly attributed to blood poisoning and which is well known to most farmers.

Nature of Blackleg Organism

Blackleg is caused by introduction to the sheep's tissues of the bacterium called *Clostridium chauvoei*, and to understand the disease better, some points about the *Clostridium* group of bacteria must be considered. They belong to a type of bacteria which live in situations where air is not present, and they form spores—that is, they form a thin protective

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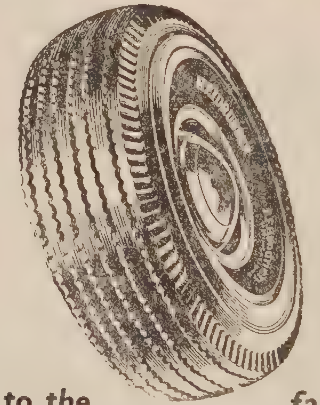

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covering membrane which enables them to live in the soil for a very long time, often for many years. Members of this group produce gas in the tissues which they invade, causing gas gangrene (malignant oedema), and some of them are responsible for causing the condition commonly called blood poisoning. These qualities are possessed by all the members of the group of bacteria to which that causing blackleg belongs.

Animals Involved

Blackleg occurs in stock running on soil contaminated with the bacteria responsible for the disease. It attacks sheep of all ages, but is commonest in young sheep. Ewes are the most frequent victims, but rams, particularly young rams, sometimes are affected.

Sheep may become infected with blackleg under the following circumstances:—

1. When concentrated on breaks of winter forage crops such as turnips or chou moellier.
2. Following farming practices (shearing, crutching, dipping, and marking of lambs) which frequently inflict minor cuts and wounds on the sheep.
3. Following lambing.

Losses on Winter-feed Breaks

Losses on breaks of winter feed occur most frequently among hoggets, but all classes of sheep are susceptible.

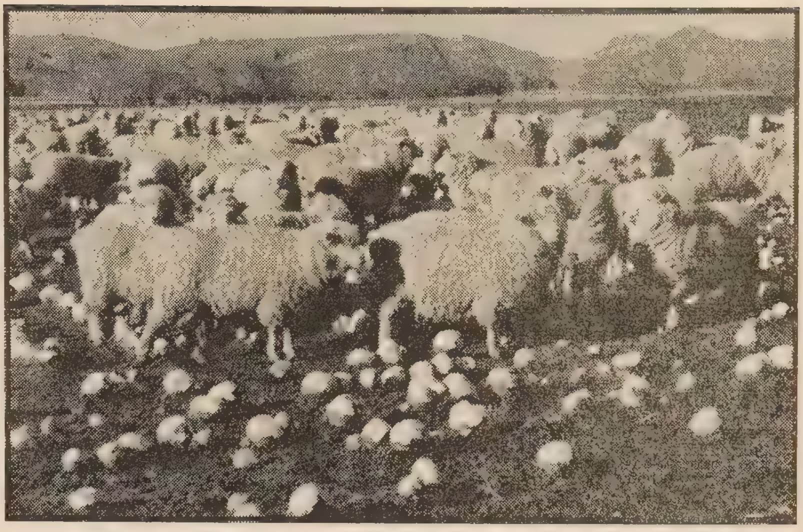
Trouble is seldom experienced until the sheep have been on the breaks for 2 or 3 weeks. In some of the cases where there has been a heavy deathrate sheep frequently have been on a break for a long time, the turnips have been eaten down to ground level, and the feed remaining has been heavily contaminated with soil. Because blackleg bacteria are present in the soil, such conditions must increase the risk of infection on properties where blackleg losses occur. Apart from blackleg such conditions frequently contribute materially to heavy infestation with intestinal worms and lung worm and malnutrition. It is wise therefore to regulate the size of the breaks so that the sheep are on each break for not more than 7 days; this is particularly important for hoggets and pays dividends in the health of the sheep. The changing of the teeth in young sheep may permit entry of blackleg bacteria. This may explain why blackleg lesions occur in the tissues of the lower jaw.

During the last few seasons in Otago and Southland it has been found that there have been considerably more outbreaks of blackleg during the latter half of the period when sheep are on winter feed than during the earlier part. Usually no symptoms are observed and the sheep are found dead. Findings at post-mortem examinations are as described earlier in this article.

Sheep may die suddenly under similar circumstances from enterotoxaemia (pulpy kidney) but with enterotoxaemia the lesions in the muscle associated with blackleg are not present.

The only sure method of determining the cause of death is to have appropriate specimens sent to the Wallaceville laboratory. Where blackleg is suspected these should consist of the following:—

1. Two or three ribs from which the attached muscles have been cut.
2. A small piece of the blackened muscle.



Because of the risk of blackleg infection from contaminated soil, it is wise to regulate the size of breaks of winter feed so that sheep are on each break for not more than 7 days.

When the sheep have died on winter feed and not after crutching, shearing, dipping, or lambing, specimens should be taken for enterotoxaemia also. In this case the necessary specimen is about 1 or 2oz. of the contents of the lower part of the small intestine (runners). This should be "milked out" into a small screwcap jar and, if possible, 2 or 3 drops of chloroform added to preserve the specimen.

Losses Following Minor Wounds

In recent years it has been found that many deaths which follow minor wounds inflicted during shearing, crutching, dipping, etc., formerly attributed to blood poisoning are, in reality, caused by blackleg. The appearance of the two diseases is very similar and, of course, they are caused by very similar and closely related bacteria.

The slight difference between them, however, is of great practical importance. There is an effective vaccination to protect sheep against blackleg, but there is no such vaccine for combating blood poisoning.

Where losses through blackleg follow minor wounds the germ gains entry to the sheep's tissues through the wound, and some authorities consider the damage to tissue plays an important part in allowing it to become established there. Another important factor in these cases is that near yards, shearing sheds, and dips, where large numbers of sheep are frequently concentrated, the soil may be heavily contaminated with blackleg bacteria.

Generally the trouble occurs within 2 or 3 days after shearing, crutching, or dipping. Frequently the wound allowing the access of bacteria is found easily and the blackleg lesion is in the vicinity of it. However, if wounds are very small (particularly after dipping this is frequently the case), they are extremely difficult to detect.

In connection with blackleg losses due to some form of wounding attention must be drawn to the fact that the same thing may happen following vaccination against blackleg, as a small puncture is, of course, caused by entry of the vaccinating needle. However, if the necessary precautions are taken the risk of infection through a vaccination wound is small. The precautions which should be taken when vaccinating sheep were described in the article "Vaccination of Sheep for Enterotoxaemia, Blackleg, and 'Scabby Mouth'" by C. V. Dayus, Livestock Superintendent, Department of Agriculture, Dunedin, which appeared in the May, 1949, issue of the "Journal."

The main precautionary measures may be summarised briefly as follows:—

1. Vaccinate in a temporary race constructed, if possible, in a paddock where losses from blackleg have not occurred.
2. Ensure that all needles are sterilised frequently by boiling and that each needle is used only for a small number of sheep—about 6.
3. As vaccine can be contaminated by inserting a used and dirty needle into it, keep a freshly sterilised needle for filling the syringe.
4. Insert the needle carefully so that it lies just under the skin; do not stab into the muscle beneath.
5. Do not vaccinate sheep that are wet from rain.
6. Do not vaccinate sheep after having skinned, plucked, or handled dead sheep a few days previously. It is impossible to cleanse hands of infection.
7. Cleanse the hands thoroughly by scrubbing them immediately before starting to vaccinate. Do not handle the tip of the needle or any part of it that goes into the skin. Do not touch the sheep; let someone who is not vaccinating handle them.

Losses Following Lambing

On properties where blackleg infection exists the disease frequently is

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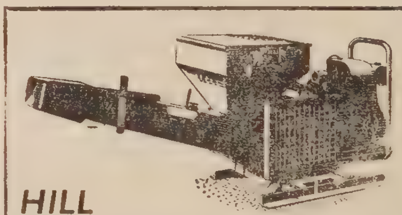

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responsible for a considerable death-rate in ewes, the symptoms being very similar to those commonly attributed to blood poisoning. The actual circumstances vary on different properties. On many farms losses occur on certain paddocks each year and never on others. Sometimes most of the ewes which are assisted at lambing will die of blackleg. On other properties it is found that any ewe which is tied along a particular fenceline at lambing time will become a victim of blackleg.

Often it is most interesting to trace the history of a paddock when blackleg losses occur. In many cases it is found that the paddock was a sheep-camp paddock or similar place where considerable numbers of sheep were frequently concentrated, often years previously, when the present farm was part of a large station. The soil on such an area has become heavily contaminated with blackleg bacteria through carcasses of dead sheep being left to decay on the paddock year after year. In this connection it is most important in reducing blackleg infection on any property that carcasses of dead sheep should be disposed of properly. They should not, as is done frequently, be left to decay on paddocks or turnip breaks, or, even worse, in the vicinity of yards.

Prevention of Blackleg

From the practical farmer's point of view prevention of the disease is the most important consideration. Fortunately losses from blackleg can be reduced to a very low level by vaccination and by management planned to reduce risk of infection.

Vaccination

Vaccination is by far the most effective means of minimising losses from blackleg, as practical experience of it on a large number of farms has proved.

[*National Publicity Studios photo.*

Lambs should always be marked in temporary yards, preferably in a paddock where blackleg has not occurred.

[*Sparrow Industrial Pictures Ltd. photo.*

On some properties it is found that reducing the time mobs are held in yards to the minimum helps to reduce the incidence of blackleg.

Before vaccinating it is necessary to be sure that blackleg is the cause of losses. In most cases this entails having specimens sent to the Wallaceville laboratory. Farmers should enlist the assistance of the local Veterinarian or Inspector of Stock of the Department of Agriculture. These officers will investigate the cause of losses and will also demonstrate and advise farmers on correct vaccination technique.

When to vaccinate: This depends entirely on when losses have occurred in previous years. Farmers should vaccinate 3 or 4 weeks before losses are expected to occur, whether among sheep on winter feed or after shearing, crutching, or lambing, as sheep will then have the highest degree of protection at the time when they need it most—immunity develops about 2 weeks after vaccination.

Management to Reduce Losses

Losses through blackleg can be reduced by adopting certain management practices, though they will not be as effective as vaccination.

First, everything possible should be done to avoid contamination of the soil with blackleg bacteria; proper disposal of carcasses is most important.

Blackleg losses are worse on certain paddocks on a property than on others. Whenever possible such paddocks should not be used for lambing ewes, nor, if possible, should lambs be marked there, sheep vaccinated on them, or recently shorn or crutched sheep grazed there, and such paddocks should not be broken up for winter-feed crops. It will not always be possible to avoid infected paddocks for the operations mentioned, but everything done in that direction will help.

On some properties it is found that reducing the time mobs are held in yards to the minimum helps to reduce the incidence of blackleg. Again, it is often an advantage to clear the counting-out pens as frequently as possible during shearing or crutching and to get the sheep clear of the yards as quickly as possible. If yards are very dusty, the dust should be laid with water as a further precaution.

Thorough scrubbing of the shearing board with disinfectant and the cleansing of handpieces are also worthwhile practices.

Lambs should always be marked in temporary yards, preferably in a paddock where blackleg has not occurred.

Instruments used for marking lambs or lambing ewes should be sterilised by boiling them for 5 minutes before beginning operations and again at morning-tea, lunch, and afternoon-tea breaks, or, if possible, at more frequent intervals. Where possible a person who has skinned, plucked, or handled dead sheep should not assist lambing ewes, mark lambs, or vaccinate sheep; when, as is often the case, this cannot be done the greatest possible care should be taken to cleanse the hands of infection. It is best to scrub them very thoroughly, using a nail brush and soap and paying particular attention to the nails. Disinfectant may be used. However, as it is not possible to cleanse the hands entirely of heavy infection, a pitch fork may be used for handling carcasses and risk of infection avoided. When sheep are dying from blackleg it may help to reduce losses if they are removed from the paddock where deaths are occurring.

Careful attention to these practical points in management can do much to reduce the risk of infection on properties where blackleg exists.

Prevention and control of blackleg can be achieved most effectively by vaccination and thoroughly planned management; both are important and the latter should not be neglected. It must be stressed that each farm where blackleg losses occur has its peculiar problems. Success depends on the application of the principles of control (vaccination and management) to the problem as it exists on a particular farm. This is most important with regard to the time of vaccination.

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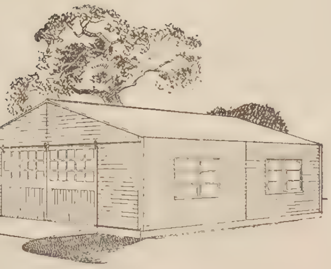

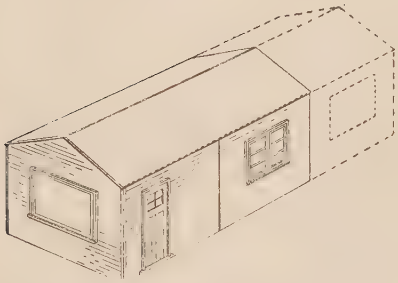

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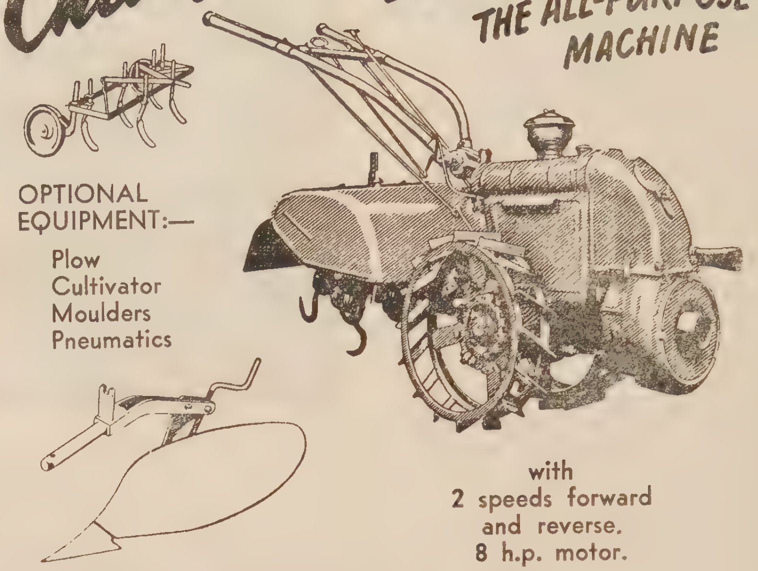

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Stony, Gorse-covered Land Brought in by Heavy Machinery

A load of seed and manure and a rubber-shod broadcast drill. [*P. Shankland photo.*

ABOUT 10,000 acres of stony land covered by gorse, and in some cases by manuka also, has been cleared and brought into production by the use of heavy machinery in the Wairarapa during the past 8 years.

THE gorse is burnt in January or February, sometimes being crushed with a heavy roller as well. Ploughing with a heavy plough, single or double furrow, is begun about 2 months later. By this time the burnt remains are brittle and break up fairly easily. The land is ploughed as deeply as possible and levelled by using old traction-engine wheels dragged behind a crawler tractor instead of the usual cultivation methods.

Some contractors favour sowing grass after this initial cultivation and leaving the land for 3 years before ploughing again. The usual type of seed sower is used, fitted with rubber-shod wheels to lessen the jar on the machine on the stony ground. A chain-type harrow is used to cover the seed.

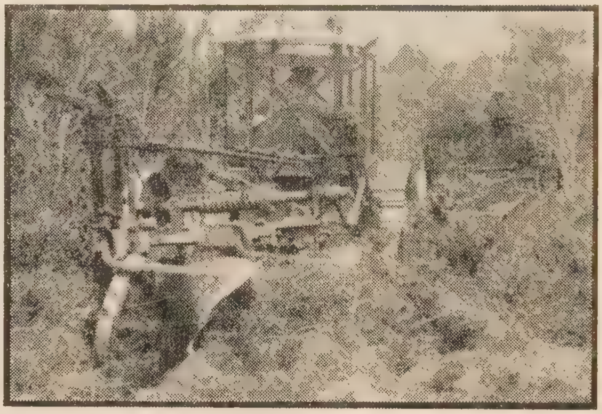
Other contractors favour bulldozing or picking the heavier stones from the area and sowing barley or chou moellier instead of grass. If this method is used, the area is ploughed again after these crops, but not as deeply as in the first ploughing and with a lighter plough. The land is levelled by the traction-engine wheel method, stones being handled in the same way as for the first crop. The land is then put down to permanent pasture, this time being rolled with a 15-ton roller after the seed has been sown. The result is an area very nearly level.

A roller weighing some 3 tons is favoured by some contractors, who maintain that the lighter roller of a smaller circumference pushes the stones in front of it until a soft spot or hollow holds them, when the roller passes over them, pushing them into the soil. A heavier roller of greater circumference passes over the stones without moving them, and if there is a hard spot under them, they are not pushed in to ground level.

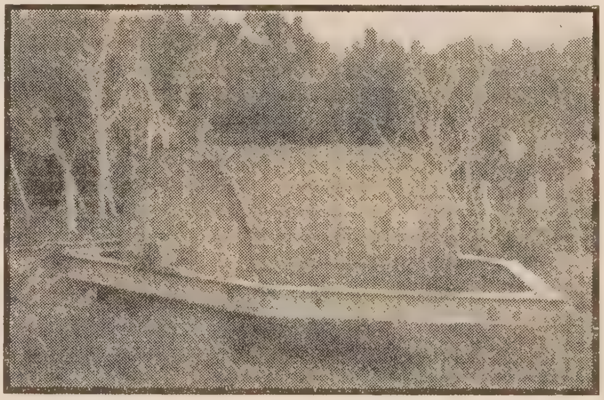
Once a good pasture is established the gorse causes no further worry, as any small seedlings that come up are eaten by grazing stock. Sheep are most suitable for grazing such land. On some areas where the stones are not too big, good crops of oats are being grown and harvested.

The cost of the first ploughing only is between £5 and £6 per acre.

—*J. H. SUTHERLAND, Inspector of Stock,*
Department of Agriculture, Masterton.



[*P. Shankland photo.*
Launching the attack on heavy gorse and manuka.



A 15-ton roller.

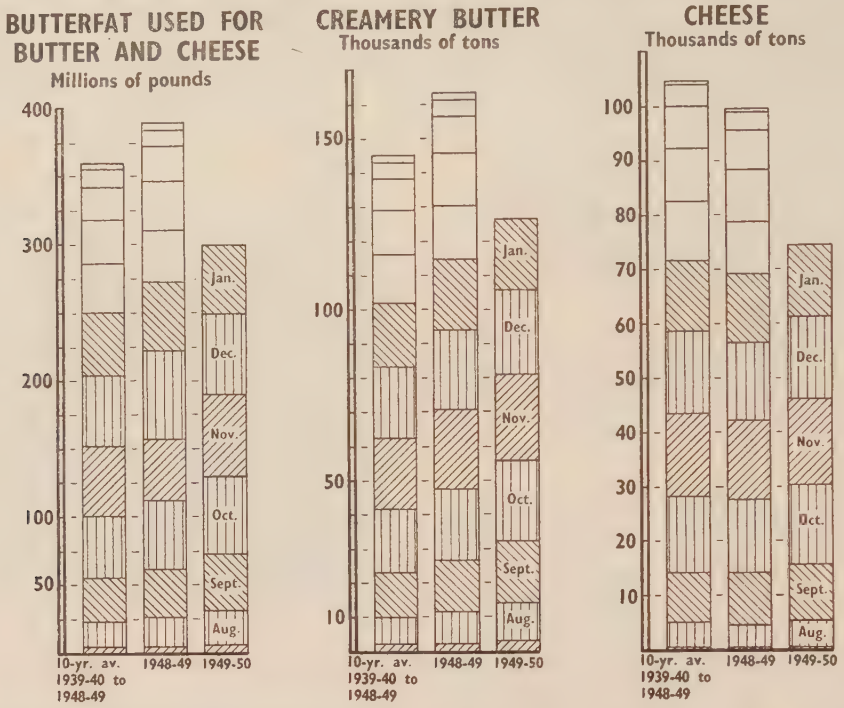
Sheep grazing pasture on land broken in from gorse. [*P. Shankland photo.*

PRIMARY PRODUCTION MONTHLY REVIEW

From data supplied by the Statistical Section, Extension Division, Department of Agriculture, Wellington

DAIRY PRODUCE (FACTORY PRODUCTION ONLY)

Season July 1 to June 30: Order of months July to June reading upward in each column



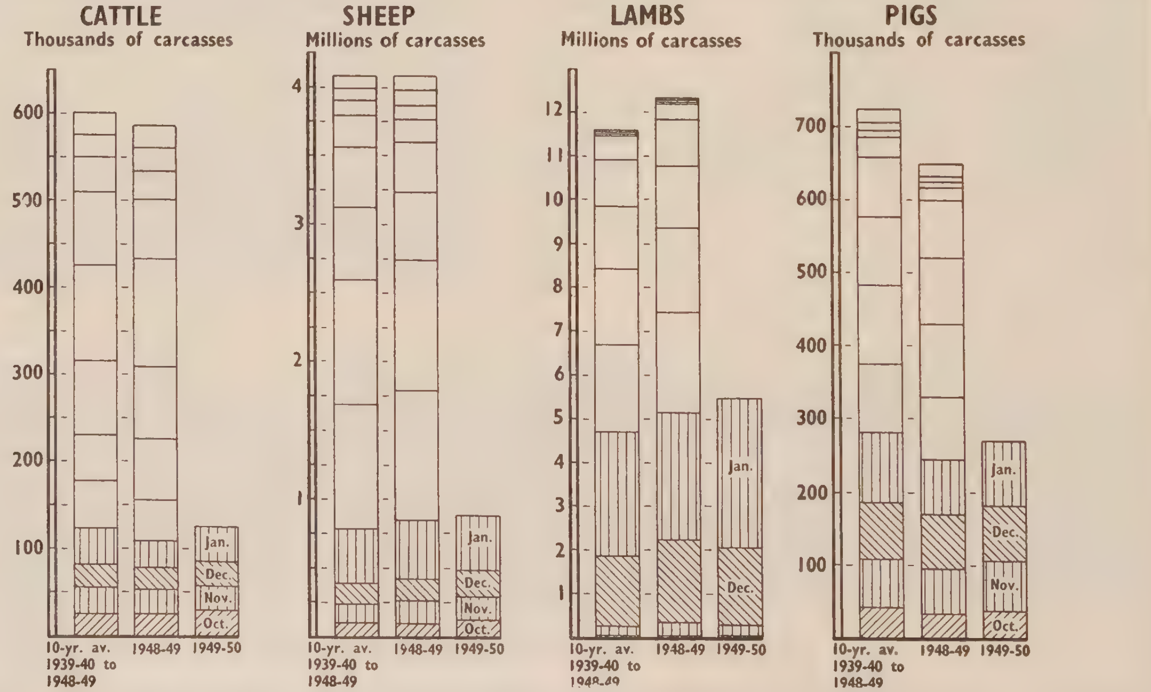
BUTTERFAT USED FOR BUTTER AND CHEESE
Millions of pounds

CREAMERY BUTTER
Thousands of tons

CHEESE
Thousands of tons

LIVESTOCK SLAUGHTERED AT MEAT EXPORT WORKS AND ABATTOIRS

Season Oct. 1 to Sept. 30: Order of months October to September reading upward in each column



CATTLE
Thousands of carcasses

SHEEP
Millions of carcasses

LAMBS
Millions of carcasses

PIGS
Thousands of carcasses

HEADING PHOTOGRAPH: Every advantage should be taken of a fine spell to cultivate between growing crops. Sparrow Industrial Pictures Ltd. photo.

THE HOME GARDEN IN JUNE

By S. O. GILLARD, Vegetable Instructor, Department of Agriculture, Auckland.

IF autumn sowing and planting have been well planned, there should be a good supply of winter vegetables in the garden and a surprisingly wide variety for harvesting in June. Winter-maturing kinds include carrots, parsnips, turnips, swedes, cabbage, cauliflower, brussels sprouts, celery, leeks, silver beet, curly kale, spinach, and even lettuce in the warmer localities. Supplies of vegetables such as onions, pumpkins, and kumaras harvested in autumn and suitably stored should still be available and the housewife should have a very satisfying range from which to choose.

WITH the coming of colder weather and more unsettled conditions many home gardens soon become untidy, not directly as a result of winter conditions, but indirectly, as gardening is not so popular in winter with most home gardeners and the temptation to neglect garden work becomes stronger than at other times. However, a little determined effort each weekend can soon put the garden in good order and for the next month or so it can be easily maintained in that condition.

Although crops already planted will still be making progress, growth is slow at this time and the ground is rapidly losing the warmth so necessary for germinating seeds. Little sowing except of a few hardy kinds of vegetables can be done with success even in the more favourable localities until the ground begins to warm up again.

Every advantage should be taken of each spell of fine weather to cultivate around growing crops. Cultivation is of great assistance in aerating waterlogged soils and reducing the moisture content when it is too high. Soils which are inclined to pack down after heavy rains require more frequent cultivation than lighter soils. The growth of plants depends largely upon good growing conditions for their roots, and poorly aerated and waterlogged soils soon inhibit root growth and activity. That is why plants in open-textured soils grow better, particularly in winter, than those in closely compacted soils.

Light cultivation with a hoe should be frequent enough to check weeds which, if they are allowed to grow, rob plants of food and also provide hosts for insect pests and diseases. Cultivation should be shallow close to plants, or their roots may be damaged, but between rows the soil may be loosened up with a fork or drawn up to large plants such as cabbage, cauliflower, and brussels sprouts to help support them. Moulding up the soil to form ridges also helps soil drainage and should always be done with winter crops in wet soils.

In the warmer localities, provided soil conditions are favourable and the garden lies to the sun, seed of broad beans, spinach, early peas, turnips, and beetroot may be sown. Cabbage and cauliflower plants may also be set out. However, unless soil conditions are really suitable, little advantage is gained by sowing seed at this time.

Although little sowing and planting can be done during winter, fine days can be used for many other garden jobs of tidying up: Renewing or repairing trellises or wooden garden edgings, etc. A surprisingly large number of minor repairs often accumulate during the busy season and await the attention of the handy man. Winter usually provides the necessary time for this work, and it should be remembered that minor repairs if neglected can involve extensive work at a later date. Although garden tools should always be put away clean, this is especially important during winter, when they are more likely to be caked with mud. Dirty tools make hard work of even light jobs; kept clean and sharp tools are a pleasure to work with.

In winter spare time can often be used to clean out the tool shed and sort out many odds and ends which get lumped together during the rush of the busy season. Stakes may require sorting and tying in bundles, the garden line may need renewing, or odd lots of manure may be lying about in frail bags and should be placed in sound containers for future use. With the spraying season over, materials left on hand should be labelled carefully and put away, and preparations should be made to secure further spray materials in plenty of time. The spray pump should be overhauled. A little time spent now while there is no pressing work on hand can save much inconvenience during the busy season.

As crops are harvested the land should be dug and left in a rough state or thrown up in ridges to secure the

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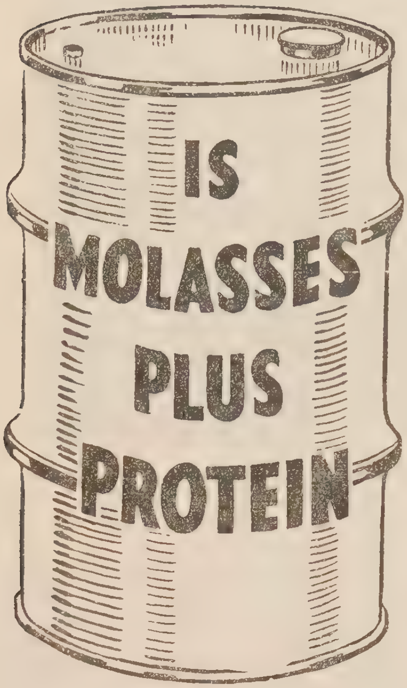

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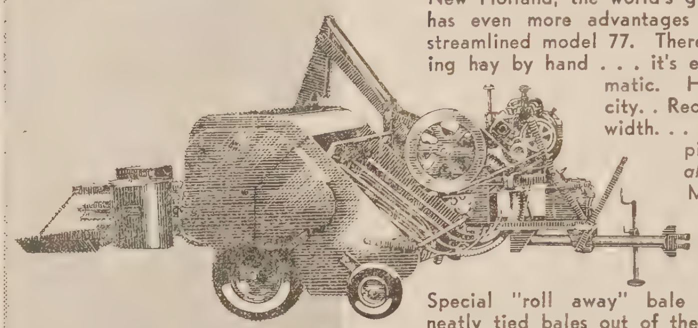

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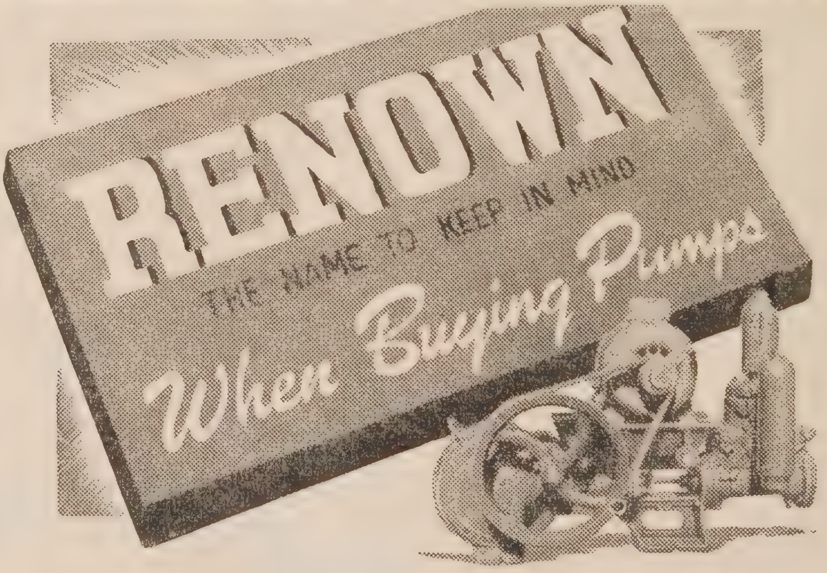

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benefits of exposure to winter weather. If the garden is inclined to lie very wet during winter, it would probably be advantageous to open up one or two temporary drains to run off surface water.

Green crops growing on land required for early cropping should be turned under early enough for decomposition to take place before seeding or planting is to be done in spring.

Lime may be spread on unoccupied ground and winter rains relied on to wash the lime into the soil.

If this work has not been done already asparagus beds should be cleared of fern growth and mulched.

In cooler districts cauliflowers approaching maturity should have some of the leaves drawn up and tied over the curds to protect them from frost. Celery and leeks should be moulded up to promote blanching, and potato crops which have matured should be dug without further delay, as there is nothing to be gained by leaving them longer and they tend to deteriorate if left in wet soils.

Vegetables in storage, such as potatoes, pumpkins, and onions, should be sorted over and any showing signs of decay promptly removed.

Garden Equipment

Work is made much easier if the right kinds of tools and equipment are chosen and kept in good order. Though there are many kinds of handy gadgets and tools for special purposes, the following set is recommended as a suitable outfit for the average vegetable garden:—

A strong spade for digging: Preferences vary as to the best type of spade, but one with clean lines and a smooth surface will cause the least adherence of sticky dirt.

A long-handled shovel for making trenches, moving soil, or turning compost heaps. Many gardeners prefer a long-handled shovel for digging. For that purpose the blade of the shovel should be at only a slight angle from the line of the handle. For other than heavy soils the long handle of a shovel makes for easy digging and saves bending. Some gardeners fit their spades with long, straight handles and claim that this takes the "backache" out of digging.

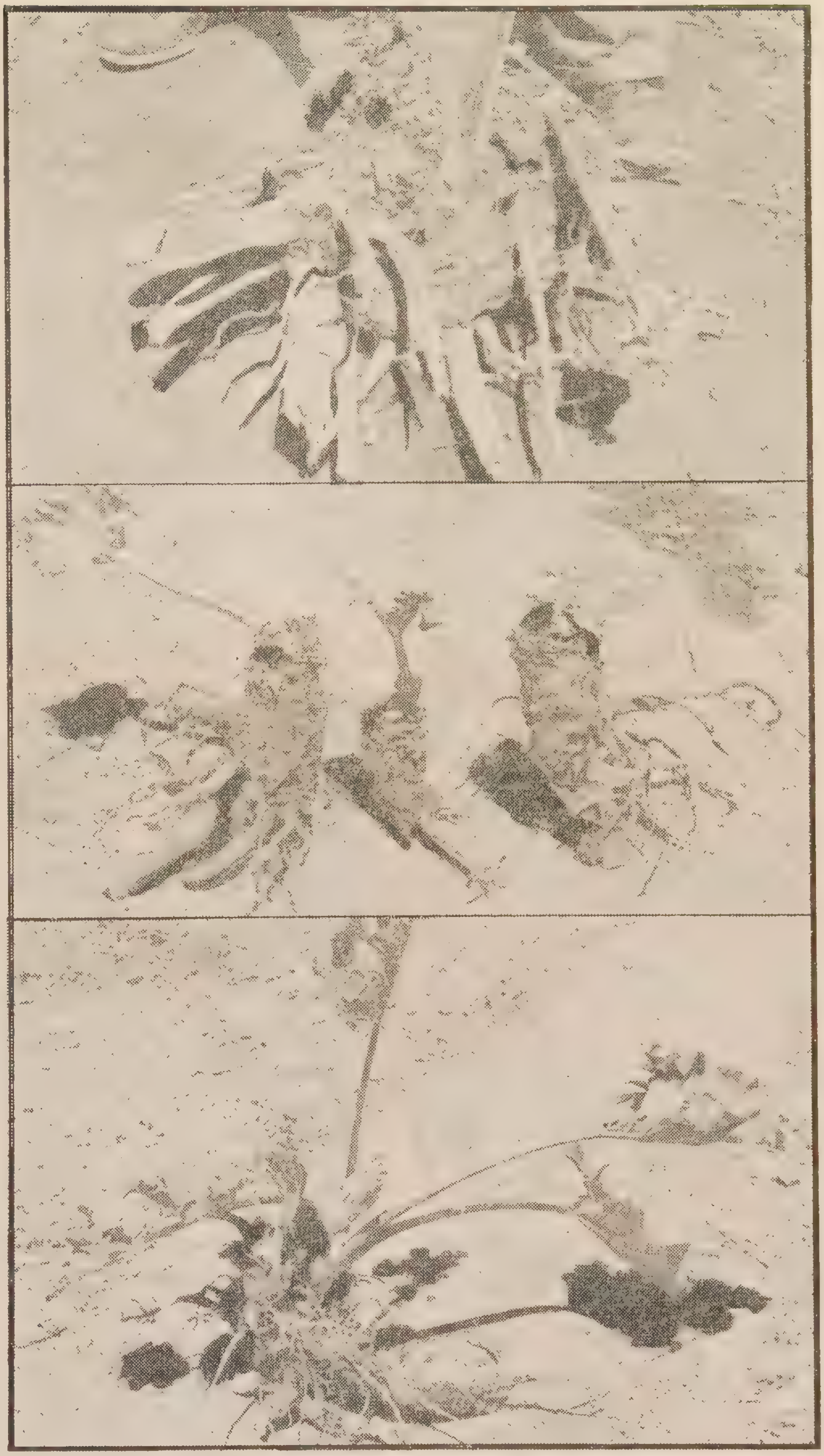
A 4-pronged garden fork for digging root crops, handling rubbish, spreading manure, and forking out weeds. A garden fork is very suitable for lightly turning over dug soil before planting.

A swan-neck hoe for general cultivation. This is a very useful implement for securing good tilth before planting.

A Dutch or push hoe of the torpedo type for shallow cultivation, to destroy weeds between rows of vegetables. Dutch hoes are particularly handy in light soils.

A 3-pronged, long-handled cultivator for loosening up soil between crops.

A garden rake for levelling the soil, for final cultivation of seed-beds, for making (with the rake turned upside down) shallow drills for small seeds, and for general cleaning up around the garden. It should be a good strong make, as the rake is used for such a variety of tasks.



[Sparrow Industrial Pictures Ltd. photos.

Every 4 or 5 years rhubarb should be dug up and the crowns divided and replanted. The best time to do this is when plants are dormant, usually during June or July. Crowns can be left in a shaded place until the main buds begin to swell, when crowns should be divided and portions with one or two bold buds, and preferably a piece of root, can be planted. Any long, whip-like roots should be shortened before planting. If desired, crowns can be dug up, divided, and sections with good, large buds planted immediately. Upper—Dividing a crown. Middle—Sections suitable for planting. Lower—A suitable portion of an ever-bearing variety ready for planting.

THE HOME GARDEN IN JUNE

[*Sparrow Industrial Pictures Ltd. photo.*

Raising cauliflower, cabbage, and lettuce plants during winter. The glass should be removed for a few hours on fine days so that plants do not become drawn and weak.

A small, hand garden fork and trowel: These are invaluable for planting out seedlings and for weeding around plants. A small, flat trowel like a bricklayer's trowel is very handy in the garden and preferred by many to the conventional garden trowel.

An old knife with strong handle and blade. This is very useful for several purposes from cutting string to weeding.

A wheelbarrow: If not required for shifting heavy loads, a wheelbarrow should be as light as possible; a wheelbarrow with a pneumatic tyre is preferable.

A spray pump: This may be of bucket or knapsack type according to personal preference. A bucket pump with 10 to 12ft. of hose, a 4ft. lance, and disc nozzle is probably the better type for mixed gardens with fruit trees; however, two people are required to operate it efficiently. The knapsack sprayer can be operated easily by one person.

A garden line as a guide for making straight rows. Heavy-weight fishing line makes a good, strong garden line. It should be attached to durable stakes, sharpened at one end.

Hedge shears: These will be required in most gardens.

When the necessary equipment has been purchased it should be kept in good condition. All tools should be cleaned immediately work ceases and rubbed over with an oily rag. This may seem laborious, but the extra work involved in cleaning and wiping tools is well repaid when they are again used. All tools, including the barrow, should be kept under cover to prolong their life.

The pleasure of gardening can be increased greatly by using good tools kept in good order. A sound practice with new tools is to rub the handles well with an oily rag before using them.

Sharpening tools takes less time and much less effort than is wasted in using blunt ones.

Asparagus

Asparagus beds should be cleaned up ready for spring growth. The fern growth should be cut 2in. from the ground (hedge shears are ideal for this purpose) and burnt on the bed. The ashes should be spread evenly along the bed. Burning will destroy the ripened seed and prevent unwanted seedlings becoming a nuisance. After the bed has been weeded the soil should be lightly forked over and compost or well-rotted animal manure then spread to a depth of 1 to 2in.

Broad Beans

Broad beans, a popular vegetable, often prove a disappointment to the home gardener. Late planting is often one of the reasons for failure; if a sowing has not already been made, it is not too late to put seed in now. Advice on sowing was given in last month's "Journal."

Cauliflower

Cauliflower plants may be set out in the warmer districts as recommended in last month's "Journal."

Good hardy varieties are Walcheren, All Seasons, and Phenomenal (5 months).

For August planting it will be necessary to sow seed of an early-maturing variety this month. Because of slow germination at this time of the year in open beds, it is advisable to provide some protection. The bed should be prepared in a sunny position and a bottomless box placed firmly on the bed. The seed should be sown thinly within the box and lightly covered with a mixture of finely sieved compost and sharp sand. After a light watering has been given a sheet of glass should be placed over the box to give added warmth; the glass must be removed as soon as seedlings appear.

When the seedlings are about 2in. high they will need transplanting into a larger frame where they will receive some protection from bad weather and where additional room is available for the development of the young plants to a suitable size for planting out.

The early, or quick-maturing, sorts are a little more difficult to grow successfully and the main reason for disappointment is often lack of care of the seedling plants. They should be kept growing steadily and should not receive a check at any period; this may occur through lack of moisture, overcrowding, or leaving them too long in the seedling boxes before transplanting them.

Suitable varieties for sowing this month are Early London, Snowball, and Phenomenal Early.

Cabbage

There is still time to set out cabbage plants for spring use, provided soil conditions are right and a warm, sunny position has been chosen. Seed may also be sown this month to produce seedlings for planting out in August. Seed should be planted in the manner described for cauliflower.

Suitable varieties for seeding or planting this month are:—

Pointed types: Flower of Spring, Enfield Market, Jersey Wakefield, and First Early.

Round-headed types: Golden Acre, Earliball, Vanguard, and Copenhagen Market.

Lettuce

In warmer localities lettuce seed may be sown in June, but special preparations and care are needed. Seed should be sown thinly in a seedling box filled with a mixture of good soil and sand and then covered with a sprinkling of fine soil. The box should be placed in a warm, sunny position and covered with a sheet of glass until the seedlings appear, which should be in 5 or 6 days. A light watering may be necessary 2 or 3 days after sowing if the soil appears to be drying.

As soon as the seedlings are 1in. high it is advisable to prick them out into boxes, allowing 2in. between plants each way. This will give sufficient room for the seedlings to develop into sturdy, stocky plants for setting out in the garden. After being pricked out plants should be given a light watering to settle the soil around the roots, and the boxes should then be placed in a frame and protected with scrim or glass sashes during inclement weather.

When seedlings have reached about 4in. in height they will be ready for planting out and meantime the bed should be prepared for them. A warm, well-drained position is necessary and it should receive as much sunshine as possible. If it is not naturally well sheltered from cold winds, protection will have to be provided. Manuka or sacking can be used to make a fence sufficiently high to keep off cold winds.

[*Sparrow Industrial Pictures Ltd. photo.*

Young yam or oka plants 8 weeks from planting.

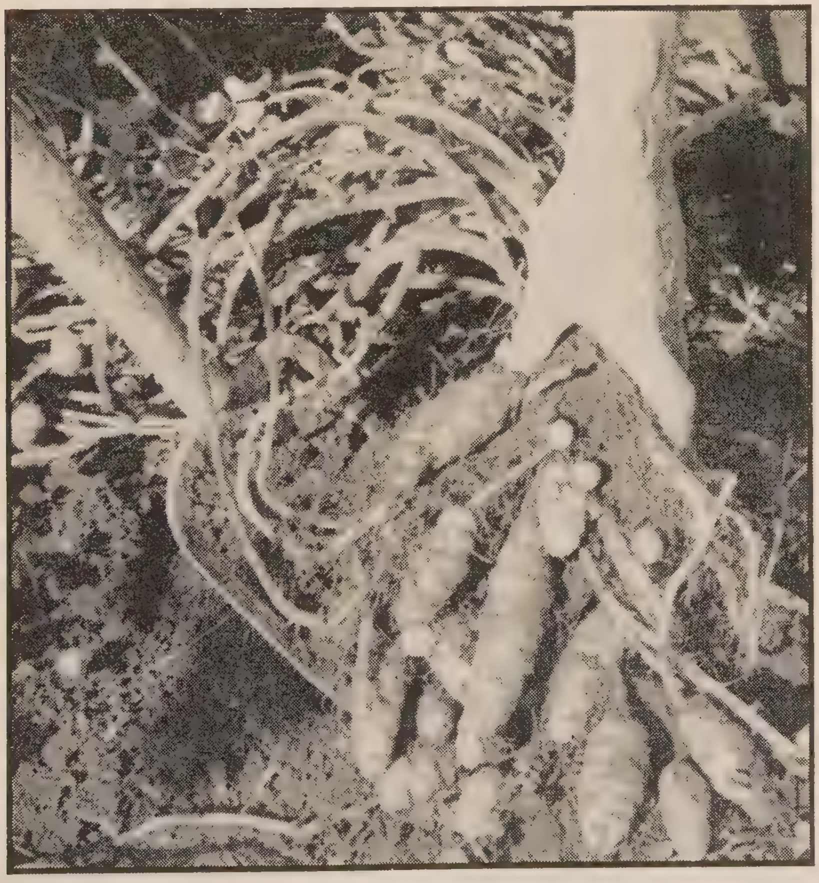
A raised bed will gain additional warmth, and a convenient width is 4ft. Approximately a week before planting is to be done 4oz. of dried blood, 5oz. of superphosphate, ¼oz. of sulphate of ammonia, and ½oz. of sulphate of potash should be spread to each square yard and hoed into the top 3in. of soil. Plants are set out 9in. apart in rows across the bed, allowing 12in. between the rows.

Suitable varieties for this time of year are Imperial 615, Neapolitan (winter strain), and All Year Round.

Onions

Onion seedlings for transplanting in August should now be well forward. They should be kept free of weeds, which would smother the plants or cause them to be weak and spindly. The ground intended for growing the onion crop should be prepared early so that it will consolidate sufficiently before planting time. It should be deeply dug and for best results should have mixed into it a humus-building material such as animal manure or compost.

Spring onions: Seeds of this popular salad crop can be sown now. Choose only a sheltered part of the garden and, if drainage is poor, make a raised bed. To obtain small spring onions the seed can be sown broadcast and lightly covered with soil, or it can be sown fairly thickly in rows 6in. wide. The soil should be firmed over the seed with the back of a spade.



[*Sparrow Industrial Pictures Ltd. photo.*

Harvesting the yam or oka plant; the illustration shows the prolific top growth and tuber development.

Radish and Peas

In many localities radish seed may be sown all the year round. They are very hardy, the seed will germinate at comparatively low temperatures, and the plants grow quickly, good-sized radishes being produced in from 30 to 40 days. Because radishes deteriorate very soon after reaching maturity, it is better to make a succession of small sowings than to put in a large quantity at one time.

Recommended varieties: Long Scarlet, French Breakfast, White Icicle, and Red Turnip.

In colder districts it is better to delay the sowing of early peas until the end of July, but elsewhere small sowings of early varieties may be made from now onward. The seed should be sown on ridges in the warmest and best-drained part of the garden, as described last month.

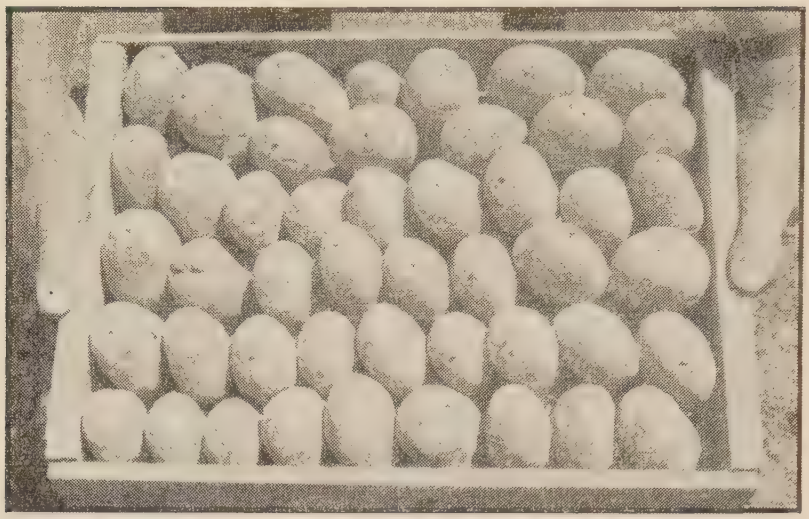
A strand of black cotton stretched along each row about 2in. above the ground protects the seedlings from birds to some extent. Another method is to cover the rows with strips of fine-mesh wire netting bent into arches and pegged down with wire hooks.

Suitable varieties to sow now are William Massey, Little Marvel, Blue Bantam, and Earlycrop.

The Oka Plant

The oka plant (*Oxalis cremata*), a native of Peru, is not known to many New Zealand gardeners, but produces tubers which can be used as vegetables. The tubers are sometimes called yams, but do not resemble those tropical vegetables either botanically or in appearance. Because the plants are frost tender and tubers require a long growing season to reach maturity,

THE HOME GARDEN IN JUNE



[Sparrow Industrial Pictures Ltd. photo.

Potatoes for next season's crop should be selected now and placed rose end up to sprout. They should then be stored in a light, airy, frost-free shed or outbuilding.

the oka can be grown successfully only in warm districts where no late-spring or early-autumn frosts are experienced.

The smooth-skinned tubers grow to about 4in. long and 1in. in diameter and are pointed at the stem end. Their colour varies from pale pink to dark red and in appearance they are not unlike artichoke tubers.

As this vegetable is not well known, extensive plantings cannot be recommended, but its culture is described for the benefit of those who like to try something new. Some gardeners who have grown the oka plant and have used the tubers as baked vegetables describe the flavour as suggestive of dried figs.

The plants are propagated by sets, as for potatoes, but the trailing foliage more closely resembles that of the kumara. Propagation by cuttings is possible, too, as the stems take root very readily. It is essential to have well-drained soil, but ample moisture is needed during the growing season, and the land should be well manured.

As soon as danger of frost is past in spring the tubers should be set 3in. deep and 18in. apart in rows 30in. apart. The soil should be drawn up to the growing plants in ridges, as for potatoes.

The oka plant requires a long season of growth, as the tubers do not mature until very late in the season, usually in May or June, and are best left in the ground until the plant is cut down by frost. It is recommended that the crop should be dug before the end of June.

Tubers when first dug have a somewhat acid taste which quickly disappears with exposure to the sun. If cured in hot sunshine for a few weeks, they become slightly shrivelled and acquire their characteristic flavour.

In districts where no frosts occur the tops should be removed and burnt. If living stems are dug into the ground they may grow and produce numerous small tubers which could become a nuisance among subsequent crops.

Use of Lime

Lime is not required in very large quantities as a plant food, but it does play a very important part as a general soil improver. It helps to sweeten the soil and to improve its physical condition, as well as helping to make other valuable plant foods more readily available. Therefore most kinds of vegetables benefit from quite large and regular applications of lime to average garden soils.

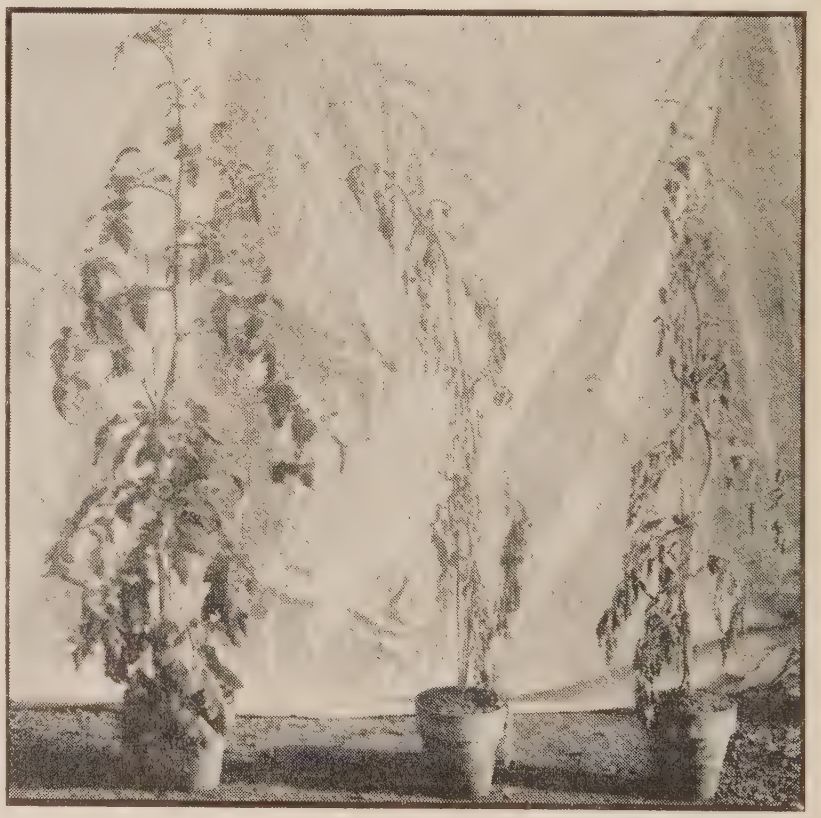
It may be added to the soil in several different forms, of which carbonate of lime (agricultural lime) and burnt lime are well known to gardeners; quantities up to ½lb. to a square yard of the former, or half that quantity of burnt lime, can be used with advantage in nearly all gardens. Experience shows that the slowly available carbonate is the best form in which lime can be applied to soil for vegetable production. It may be applied at any time, preferably as a surface dressing, which will be washed down into the soil by rains.

Where green crops are growing, or when stable or animal manures are freely used for soil improvement, the use of lime is especially necessary to correct a tendency toward an increase in soil acidity.

June is a convenient month to apply lime to the garden, as that is the month when the greatest part of the area will be unoccupied. Agricultural lime will not harm growing plants, but it is advisable to avoid spreading burnt lime over tender foliage.

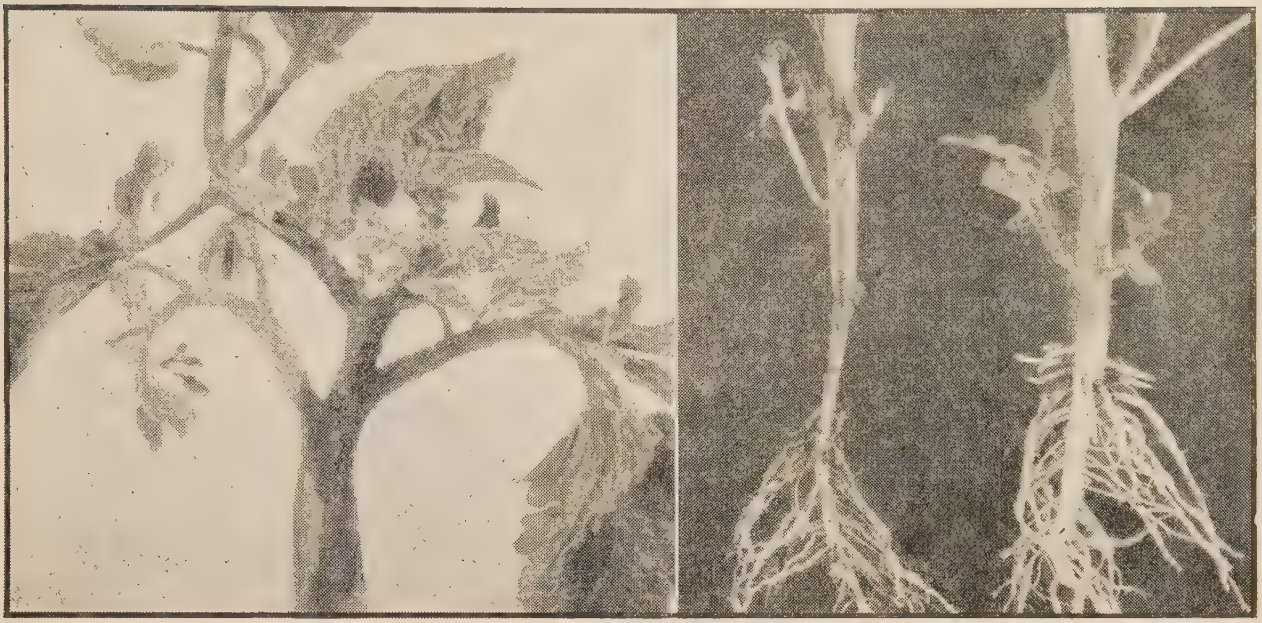
Control of Pests and Diseases

A section on control of pests and diseases in the home garden has appeared in successive issues since



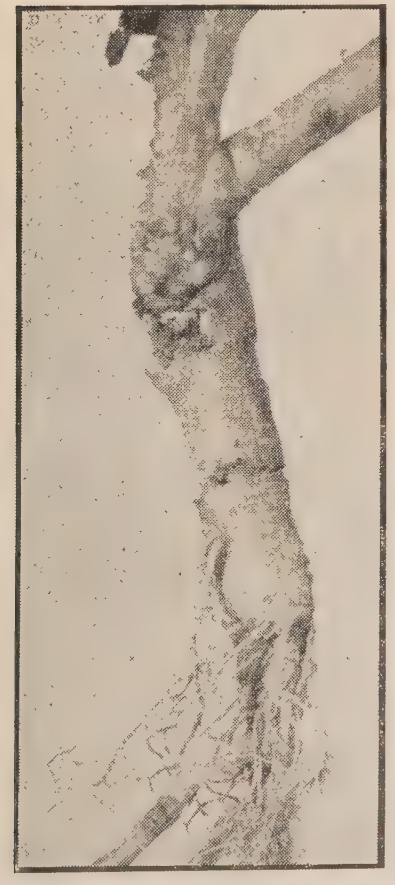
Verticillium wilt; healthy tomato plant (left) and infected plants (right).

PESTS AND DISEASES OF TOMATO PLANTS



[*Photographs at left and below by L. H. Wright.*

Left—Tomato blight *(Phytophthora infestans)*, showing infection on stem (the dark colouring extending upward). Right—Foot rot of tomato; infected plant (left), healthy plant (right).



Dwarf tomato showing typical external symptoms of stem-borer infestation in main stem at ground level.

December, 1949, and other troubles and the methods of combating them are dealt with in the following section of this month's notes.

Parsnip

Canker and rust are names used to describe large, reddish-brown or black wound areas which often appear on the upper parts of parsnip roots. The injury usually develops into a soft rot, due to the entrance of a rotting organism, which may destroy the whole root.

The trouble is due to cracking of the skin followed by secondary decay after invasion by soil bacteria or insects. Parsnips apparently do not heal after cracking as do carrots and turnips. The cracking of roots is usually aggravated by wet conditions causing rapid growth after a very dry period when growth was checked. A similar effect may be expected if the soil is too richly manured. The time of sowing may have some influence and spring-sown crops seem to be more likely to get canker than January-sown ones, owing probably to the roots tending to ripen too soon.

Treatment: Liming is important and is helpful in reducing risk of canker. Another important point is to see that the soil is well supplied with potash, which helps the plants to make steady, uniform growth less easily affected by weather extremes than the softer growth produced in over-rich soils. Parsnips should not be planted in the same place in successive years.

Aphides (*Cavariella aegopodii*) attack parsnips as well as carrots. Colonies of these plant lice suck the sap from the foliage and may retard the growth of the plant, although they seldom affect parsnips seriously.

Treatment: Spray with nicotine sulphate, 1 fl. oz. (7 teaspoons) to 4 gallons of water to which 2oz. of soft soap has been added.

Sweet Corn

Cutworms: These are the caterpillars of several species of night-flying moths. They appear mainly in summer and autumn, cutting off the young plants just above ground level. The brown caterpillars, up to 1½in. long, are encouraged by poor preparation and indifferent inter-cultivation of the garden and flourish where weed growth is not kept in check.

Treatment: The land should be kept cultivated to control weed growth, to disturb the caterpillars, and to allow birds to gather them. To control cutworms water the soil with a solution of 50 per cent. D.D.T. wettable powder, 2lb. in 100 gallons of water (1oz. in 6 gallons), at the rate of approximately 1 gallon to 50ft. of row. The application should be sufficient to wet the soil to a depth of at least 1in.

Army worms: These caterpillars are similar in appearance and general habits to cutworms, but differ in their method of attack. When present in large numbers they move through the crop, especially cereals, eating as they go and leaving devastation in their wake. These caterpillars are commonly found in the home garden damaging sweet corn cobs and foliage.

Treatment:. Spraying plants with D.D.T. wettable powder will control these pests. With a 50 per cent. wettable powder use ½oz. in 4 gallons of water and with a 25 per cent. wettable powder 1oz. in 4 gallons of water.

Tomato

Blight (*Phytophthora infestans*) is the well-known fungous disease which attacks both tomatoes and potatoes, especially during wet, humid weather. Most gardeners will recognise blight

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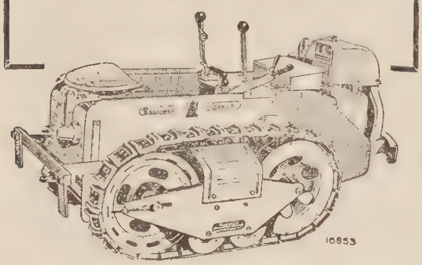

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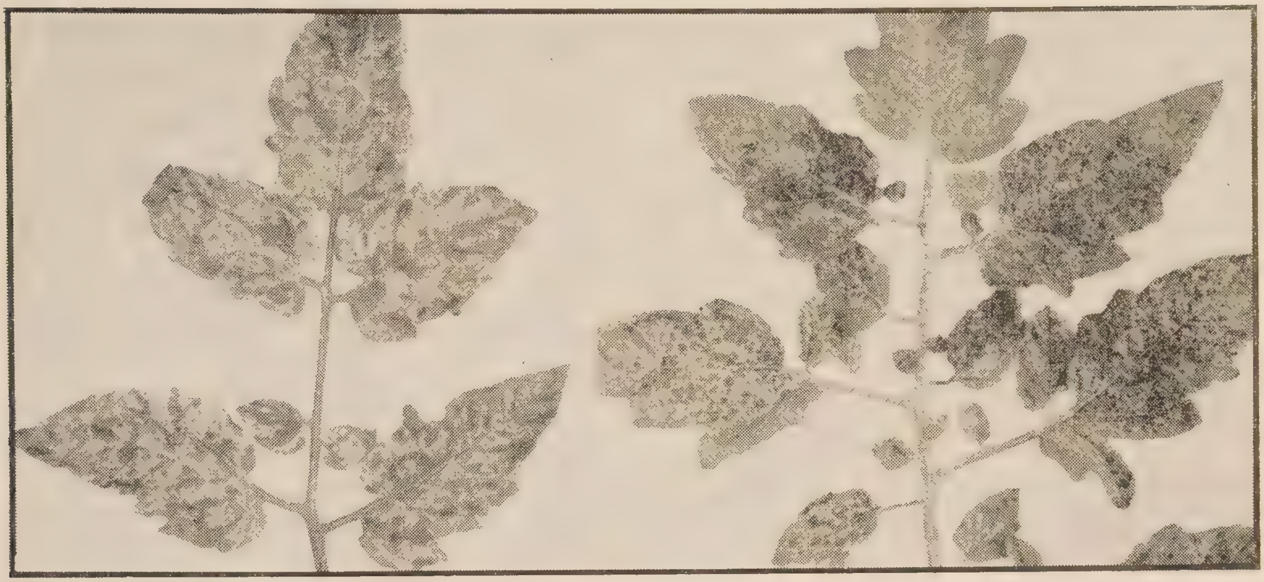


Left—Mosaic, showing mottling of tomato leaves. Right—Spotted wilt, showing bronzing of tomato leaves.

by the dark-brown or blackish patches on leaves and stems and by the rather firm, brown, marbled blotches on the green fruits.

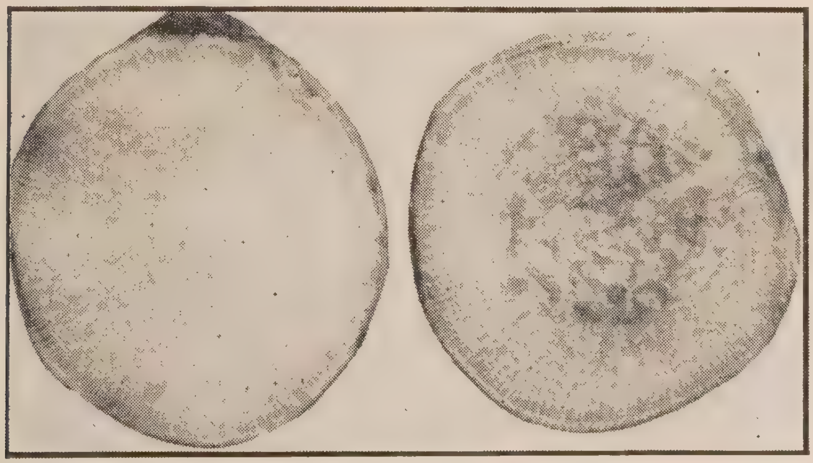
Treatment: It is essential to protect plants by spraying them from the time they are set out in the garden at regular intervals of not more than 14 days, with Bordeaux mixture (4oz. of bluestone, 5¼oz. of hydrated lime, in 4 gallons of water) or copper oxychloride (3oz. to 4 gallons of water). Diseased leaves and fruits should be picked off and destroyed.

Foot rot (*Phytophthora cryptogea*) is a fungous disease which causes blackening and rotting of tomato roots and the base of stems. It attacks and usually kills both young and old plants. The first noticeable symptom is wilting of the plant. In most cases the trouble is due to very wet soil conditions causing some of the roots to decay and thus allowing the fungus to gain entry.

Treatment: Drainage should be improved and, to avoid further contamination of the soil, where the fungus can survive for a long time, affected plants should be dug up, with soil attached, and destroyed by burning.

Verticillium wilt (*Verticillium albo-atrum*): This fungous disease causes symptoms somewhat similar to foot rot. Yellow blotches appear on the leaves from the base of the plant upward and the leaves may wither gradually. If the stem of an affected plant is cut open lengthwise, brown streaks will be seen in the woody tissues. In this disease the discoloured stalks may extend almost to the top of the plant, whereas in foot rot the brown area will not reach much above soil level.

Treatment: In the home garden little can be done to control verticillium wilt. Crop rotation should be practised and all tomato rubbish should be burnt. Sterilising the soil with steam or with a recommended soil disinfectant will control the disease, but these methods are not practicable in domestic gardens.



Brown heart of swede; healthy bulb (left), infected bulb (right).

Spotted wilt: This disease, commonly called bronze top, is caused by a virus and is the most serious of the tomato diseases. Infection shows first as small, pin-point, dark spots on the terminal shoot and leaves. The top of the plant soon becomes stunted, the young tip leaves tend to curl downward, and little or no further growth is made. Irregular brown or bronze markings appear on the leaves as the disease progresses through the system of the plant, and fruits may show irregular mottling of lighter or yellowish colour.

Treatment consists of removing and destroying infected plants as soon as the disease is noticed. Thrips, the main agents in the spread of the spotted wilt virus, may be kept down by spraying with 50 per cent. D.D.T. wettable powder, ½oz. in 4 gallons of water. Controlling thrips will help by reducing spread of the virus, and the D.D.T. will also kill tomato caterpillars.

Mosaic: This virus causes a mottling of the leaves which is sometimes accompanied by a leaf distortion, especially on dwarf varieties. The mottling shows as light yellowish-green irregular areas in the leaf-blade tissues. The fruit is sometimes affected by the disease and may show slight irregularity or mistiness in the red colouring. The disease is not as serious in its effect as spotted wilt. The virus may be spread by the hands from plant to plant when laterals are being removed or during tying up operations.

Treatment: Control measures for virus diseases were described in the home garden notes in the December. 1949, issue of the "Journal."

Narrow-leaf is a virus disease of tomatoes which causes a distinct narrowing and a slight crinkling of the young leaves. Later the symptoms become more pronounced, and in severe cases the leaves become spike-shaped and very curled. Although it does not always affect the upward growth of the plant to any extent, it reduces the leaf area, and the fruit is much smaller than usual and is inclined to be flattened and light.

Treatment: Control measures are similar to those recommended for mosaic virus.

Tomato worm (*Heliothis armigera*): This caterpillar is one of the most common garden pests. Because of its habit of boring into tomatoes and eating the contents it has been given the name tomato worm. The caterpillars vary in colour from grey to brown, with reddish or yellowish markings.

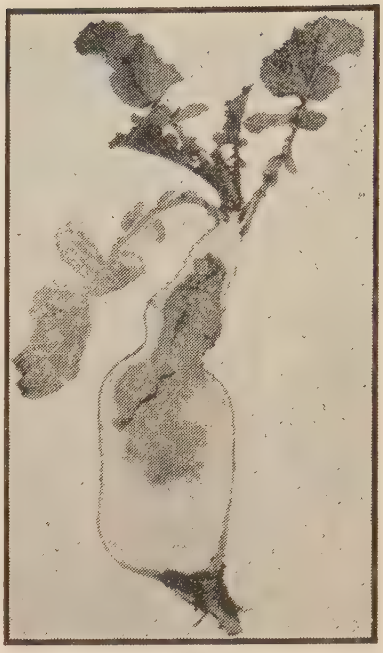
Treatment: Spray plants with 50 per cent. D.D.T. wettable powder (½oz. in 4 gallons of water), taking care to apply a coverage to the terminal shoots, as this is where the moth of the caterpillar usually lays its eggs.

Tomato stem borer (*Gnorimoschema plaesiosema*): Plants are frequently lost through the ravages of the larvae of the tomato stem borer moth. Eggs are laid on the leaves of the tomato plant and the young caterpillars burrow into the main stem, which is hollowed out, causing the plant to collapse.

Treatment: Where this trouble is experienced plants should be sprayed every 2 weeks from the seedling stage with 50 per cent. D.D.T. wettable powder, ½oz. in 4 gallons of water.

Turnips, Swedes

Soft rot (*Bacterium carotovorum*) causes a white or whitish-grey, soft mushy rot, which in wet seasons may destroy many plants. The trouble usually starts in the base of the leaf stalks; the tissue is grey or water-soaked, causing the leaves to drop and the stem to become soft and slimy. During wet weather, if leaf stalks are damaged in any way, the parasite may enter through the injury or even through a cut made in the root by a hoe when cultivating. Affected roots soon break down into a putrid mass, but the rind remains intact and affected roots are often found hollow and with some dried-up material inside the empty rind.



[*S. A. Rumsey photo.*

Swede infected with soft rot.

Treatment: As soon as a plant becomes affected it should be removed promptly to avoid possible infection of neighbouring plants, and if the trouble has been severe, turnips should not be grown on the infected site for the next two seasons.

Brown heart: Although the size and outward appearance of turnips or swedes affected with brown heart are quite good, when opened up they may have internal greyish or brownish markings in the flesh. These may be of an indefinite pattern, or the areas may be roughly concentric. The trouble is nearly always found in the stem end of the root. If it is severe, small cracks may be present in the affected areas, but if the trouble is present, it will get worse as the season advances.

Treatment: This trouble is not caused by disease, but is due to a soil deficiency, and where the trouble is found boron, which can be bought in the form of borax, should be applied just before sowing the seed. Mix 1/10oz. of borax with perfectly dry sand or soil equal to about 20 times the amount of borax so that it is possible to distribute the borax evenly over a square yard. This small amount of borax, 1/10oz. to a square yard, is considered sufficient to cure brown heart of swedes in boron-deficient soil.

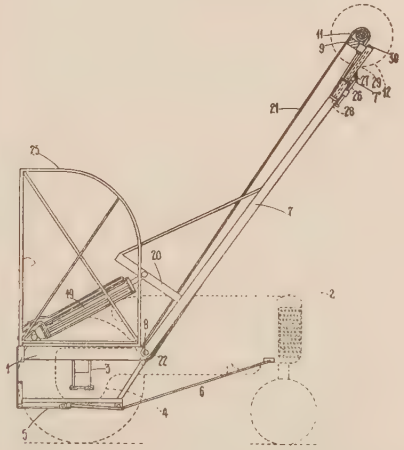
Acknowledgments

Acknowledgment is made to the Plant Diseases Division of the Department of Scientific and Industrial Research for assistance in the preparation of the section dealing with diseases and their control and for supplying the photographs included in this section.

Recent Patent Specifications for Farming Inventions

The following particulars of recent patent applications of interest to farmers have been selected from the Patent Office Journal, issued on March 2 and 17, 1950, and are published by permission of the Commissioner of Patents, Wellington. Photostat copies of any specifications will be supplied for a small fee on application to the Patent Office.

No.	Description.	Applicant.
95542	Gorse Cutter and Hedge Trimmer,	L. W. Penwarden.



[Only those references which are necessary to an understanding of the specifications are quoted in the abridgment below.]

A tractor-mounted and tractor-power-operated device for cutting and trimming hedges and the like comprises hinged beams 7 to be raised independently by hydraulic means 19 from the tractor 2 on which they are mounted, a shaft 11 across the outer ends of the beams and projecting end of the cross-shaft, and means 21 to drive the cutter by power derived from the tractor. Other features are also disclosed.

No.	Description.	Applicant.
92480	Automatic Depth Control for Implements,	Harry Ferguson Inc.
92679	Fencepost with Locking Sleeves for Wires,	Douglas Nield.
94418	Spreading Insecticides by Use of Engine Exhaust Gases,	G. W. Higgins and E. J. Allman.
94867	Truck-mounted Scoop and Loader,	C. C. Williams, F. B. Anyon, and J. T. Shanks.
95401	Shovel or Spade,	F. J. Jackson.
95891	Portable Winch,	W. C. Budd.
95906	Churn for Buttermaking,	R. F. Carver.
96961	Apparatus for Bagfilling,	J. Laverick.
97310	Distributor for Trace Elements and Seeds,	G. Shine.
97489	Tipping Barrow,	H. R. Wilton.
100877	Tool for Tree Planting,	R. D. Roxburgh, F. W. Minto, and H. M. Williams.
98185	Rabbit-poisoning Device for Cutting and Distributing Bait,	J. M. Morgan.
90609	Windmill (Pump),	L. P. Hayes.
91917	Poultry-watering Appliance,	J. G. Francis.
96870	Seed-sorter (Electric-charge Type),	F. Okolicsanyi and R. W. Gunon (Seeds) Ltd.
98639	Cheese-turning Machine,	W. H. Anderson and H. Weir.
100023	Cutter for Small Trees, Scrub, etc.,	A. M. Jury.

Small Milking Sheds for Factory Supply

CONSTRUCTION AND LAYOUT

THE sanitation of small dairies handling a few cows is as important as that of large units. This article, by S. W. Booth, Special Inspector, Department of Agriculture, Invercargill, deals with the layout, construction, and equipment of small milking sheds for factory supply.

A CONSIDERABLE proportion of the Dominion's output of dairy produce comes from small suppliers who milk a few cows to supplement their income. These suppliers all have one attribute in common: Their main income is from sources other than dairying. They include sheep and agricultural farmers who send surplus milk or cream to a factory and town and rural workers who own a small holding close to their place of employment and find dairying a profitable sideline.

Some factories, particularly in the South Island, depend almost entirely on the small supplier for their output. Formerly a considerable proportion of this supply was of an inferior quality, and it appeared to be accepted that, because his income was less, the small producer should be permitted to use poor facilities, whereas the dairyman who depended solely on his cows for a livelihood should produce his milk or cream under good conditions. That such an outlook was fundamentally wrong is now generally accepted; there can be only one standard of conditions and of cleanliness for all dairymen, regardless of quantity of output. Factory managers have shown repeatedly that a small batch of inferior-quality milk or cream can spoil a whole vat or churning.

Milking sheds, large and small, should be easy to clean and with the minimum of time and labour. In the small shed, because the owner's main occupation is not dairying, the cows have to be milked and the shed cleaned out before and after the normal day's work.

All floors, including the yards and exits, should be made of concrete or other material impervious to moisture and capable of being readily cleansed. With the exception of the floor of the milk-collecting or separator room, which should have a smooth finish, the surfaces should be semi-smooth. As it is in this room that milk or cream is stored, there should be an absence of any possible source of contamination, and a draught-proof wall should be provided between it and the bails. The floor of the bails should have sufficient fall to allow the surface to dry out. It is recommended that all corners between walls and floors should be rounded off.

Walls should be kept as clean as the floors. Wooden walls are hard to clean and are liable to rot at the bases. Open concrete walls are also hard to keep clean; for this reason all inside surfaces of concrete walls should be plastered to a smooth finish. It is recognised that the mud and manure line on the concrete walls at each end of the bails reaches to a height of 4ft.; such walls when properly finished can be kept as clean as the floors. The remainder of the walls should be at least 18in. dwarf concrete for ease of cleaning and to prevent rotting of the base plates. Where cement and shingle are readily available most farmers prefer to build either 4ft. concrete walls all round or walls entirely of concrete.

It is of paramount importance that the air supply to a dairy be pure; for that reason the surroundings must be permanently grassed and entry and exit of stock controlled on fenced, concrete races.

An open concrete drain, with a sump at the end, must be taken at least 30ft. from the yard or shed in order to keep the air about the shed as free as possible from contamination. Officers of the Dairy Division, Department of Agriculture, will advise farmers on the layout of the drainage from the shed to suit the prevailing wind and contour of the site.

Demand for Plans

Over the past few years there has been an increasing demand for plans of small sheds, for which the reasons appear to be as follows:—

Greater returns because of higher prices for dairy produce.

The contacts made with Farm Dairy Instructors.

Articles in agricultural publications, wireless talks, etc., which have led to a greater interest in shed hygiene and convenience in working conditions.

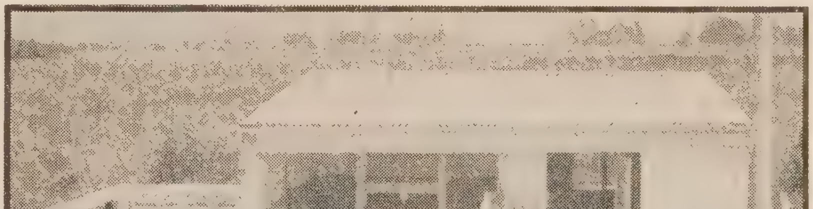
The desire to install machines to reduce time and labour, an important consideration for the small dairymen, for, as stated earlier, the milking process has to be completed before and after the normal day's work. (Manufacturers of milking machines have foreseen this demand and have designed suitable machines.)

Shed Construction

Three styles of shed are in demand for small herds:—

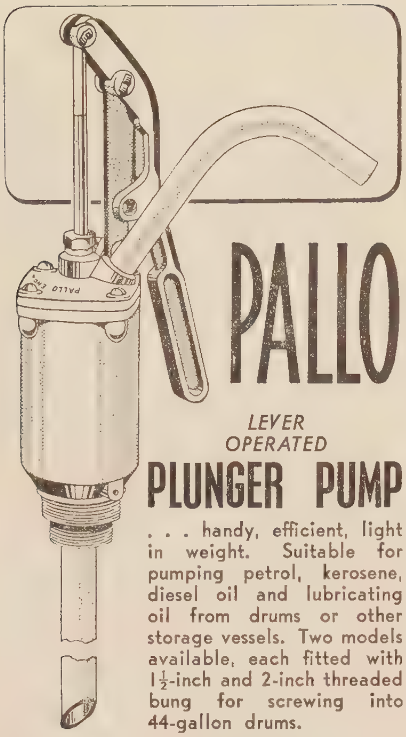
1. The back-out shed in which the cows are secured during milking, either by a dummy or by a head stall;
2. The walk-through shed with doors at the rear of the shed in the conventional manner;
3. The internal-race shed.

In planning any of the above types of shed the farmer should have in mind the possibility of the expansion of the herd if the size of the farm will permit and the resultant necessity of coping with more cans and a larger milking unit. If a bucket plant is to be installed and there is no possibility of expansion of the herd beyond a few cows, a separator room 6ft. wide is sufficient, whereas if a releaser plant is installed, the minimum width should be not less than 8ft. This width will be sufficient if at any time it is desired to increase the capacity to a 2-cow plant unit.



[*Hazledine's Studio Ltd. photo.*

Small milking shed, equipped with milking machine, which is used on a farm in Southland where dairying is an adjunct to sheep farming.



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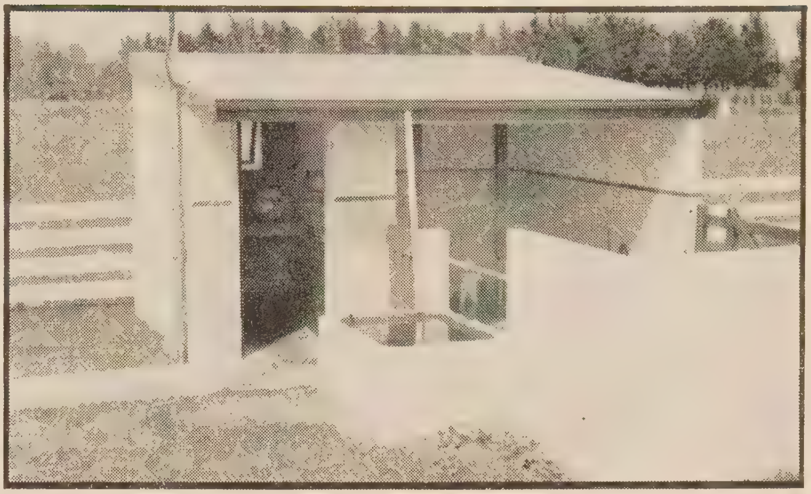


[*Hazledine's Studio Ltd. photo.*

Small dairy for hand milking. The sanitary surroundings resulting from a proper control of stock assist hygienic production.

The depth of the shed should be such as to give sufficient protection from the weather; a depth of 14ft. in the back-out and walk-through sheds is recommended and an over-all depth of 18ft. in the internal-race type.

The width of the double bail recommended in all three cases is at least 8ft. instead of the usual width of 7ft. used in large units. The reason for this increase in size is to ensure that the milker is not cramped when using a bucket machine, and also to allow two hand milkers to work comfortably in the double bail.

The increased width is taken up by the dummy of the walk-through or back-out shed and by the distance between the gates in the case of the internal-race type.

In the first two types the dummy can be suspended from the roof, the front studs being bolted to a stringer across the shed under the rafters. The internal-race shed needs too many braces to support the gate studs, if suspended from the roof, and this does not give a neat appearance. It is better to set the studs either on glazed pipes or have them bolted to iron standards set into the floor.

Though pipe bails are ideal in every way—they are neat, permanent, and easily kept in clean condition—present building controls do not permit the use of galvanised-iron piping for this purpose.

The surface of the floor and walls of the milk-collecting or separator room should be well finished, the room should be well lighted and ventilated, corners which are hard to clean should be avoided, and the separator block should be carried right across to the wall so that there is no awkward part to clean.

The electric heater may be installed in the separator room, but suppliers are advised to place their heaters under the veranda. The supplier usually stores his milk or cream in this room until it is ready to send to the factory, and for that reason there is no rising of the temperature during storage if the heater is placed under the veranda.

Selection of Site

In selecting the site for a milking shed the following are some of the more important statutory requirements which govern the shed site and its surroundings:—

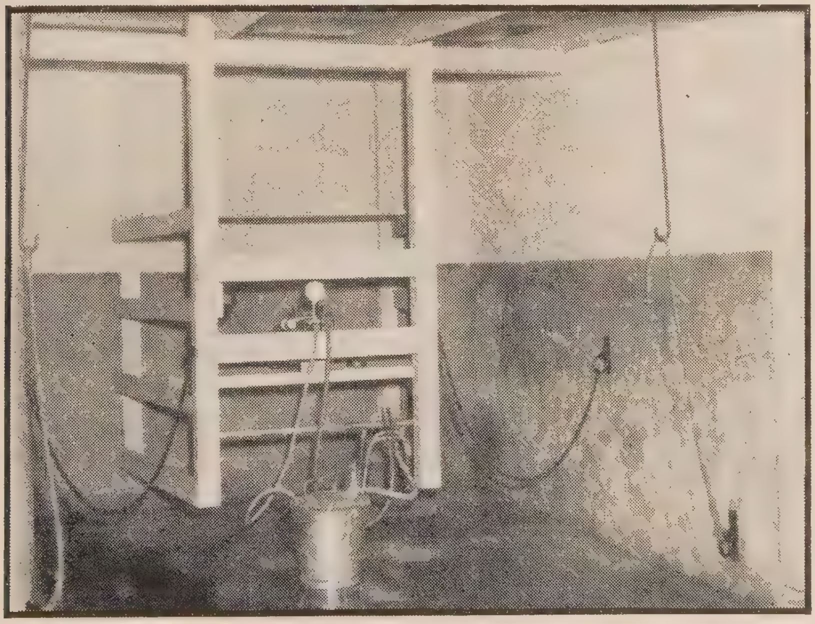
> No person shall, except with the approval in writing of the Director of the Dairy Division, use as part of a supplying dairy any milking shed or yard erected within a distance of 2 chains from any public road.
>
> No person shall keep, house, or allow pigs to wander or be brought within 50yds. of any dairy or the open water supply thereof; any fowlhouse, manure heap, cesspool, or closet must be 30ft. away from any dairy or yard; the open drainage from stock or pigs must not flow within 50yds. of a dairy or the open water supply thereof.

Skimmed milk must be removed from a dairy for cream supply immediately separation has been completed, and to prevent possible contamination of the cream the skimmed milk containers must be kept clean. Skimmed milk can be a serious contaminating influence in small dairies, which are not usually equipped with skimmed-milk pumps.

Disposal of Skimmed Milk

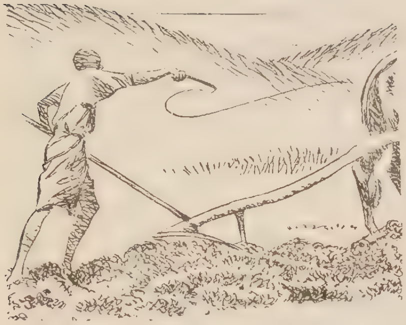
A convenient and suitable device to remove skimmed milk is the tipping type of container fitted on wheels which is used for collecting the skimmed milk from the separator and to convey it a satisfactory distance from the premises. The ideal method of disposal of skimmed milk is undoubtedly the skimmed-milk pump, which is most convenient and sanitary. Though the cost of installation may be considerable in relation to the output from small dairies, its advantages make the expenditure worth while.

Farmers who are contemplating building a small shed are advised to contact their Farm Dairy Instructor, who will give every assistance in the selection of the site and the planning of the shed.



A small dairy with suspended dummy and bucket milking machine for one cow.

PROGRESS
in Ploughing



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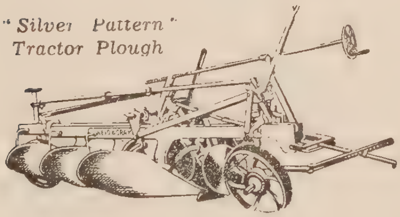

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F.1.

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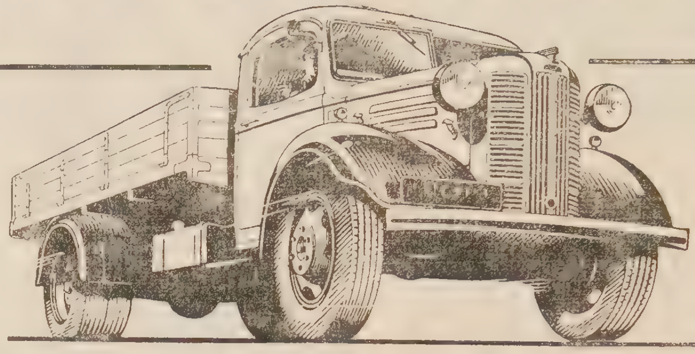

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Soil Cement as a Building Material

By P. J. ALLEY, Senior Lecturer in Civil Engineering,
Canterbury University College.

THROUGHOUT New Zealand there are a number of buildings constructed of soil. Some have been built of pise de terre (rammed earth); in others cob blocks, which are a mixture of soil and grass fibres dried in the sun, have been used; and sometimes cowdung is used as the fibrous material. Any of the above methods are subject to deterioration by the action of moisture and perhaps freezing. However, an improvement may be made in soil construction by the use of soil cement (silty material mixed with cement). This gives a building material which has a definite structural strength, besides being resistant to the action of water and frost. This cannot be said of soil construction without the cement.

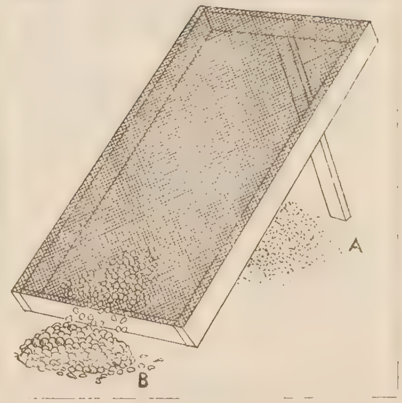

Fig. 1—Screen for removing clods. A—Powdered silt. B—Clods. The ends of the screen frame are made from 3in. x 1in. timber and the sides from 3in. x 2in. timber.

MOST people think that it is a retrograde step to live in a soil house. At any rate, while the timber resources of the country last, timber houses will continue to be built. No one stops to consider what will be the appearance of the houses in say, 50 years, or what future generations will say when they see the native forests all used. With timber houses there is the constant risk of fire; in a soil house only the furniture will burn.

Recently an up-to-date soil-cement house, which is shown in the illustration below, was erected in an attractive suburb of Christchurch. There is no wood in the building, except for window and door frames, up to the ceiling. Even the floor has been laid on the ground. The occupants are delighted with the living conditions, and they say that the building maintains a very even temperature.

Most farmers know that when cement is mixed with sand or gravel a concrete is formed, but what of silt and clay mixtures with cement? In the past such mixtures have been avoided, and the farmer has often been told that the gravel and sand used for concrete making must be as free as possible from "clay or other deleterious matter". The answer to the question is that silt can make very good mixtures with cement, but clay does not. How, then, can silt be distinguished from clay?

The farmer uses the topsoil to grow his crops and to provide the grass for grazing sheep and cattle. Beneath the topsoil lies the soil that is of interest to engineers. The colour of the subsoil generally differs from that of the topsoil, and subsoils are usually divided into a number of groups according to particle sizes. The clay group has the smallest particle size, the silt group has the next largest particle size, above the silt group are the sands, and gravels have the largest particle size. Classification is a job for a soil laboratory, unless a person happens to be sufficiently expert to be able to tell the difference between silt and clay. If there is any doubt about the type of material, a 20lb. sample should be sent to a soil laboratory for testing. The Soil Bureau of the Department of Scientific and Industrial Research, Wellington, has done some testing of suitable materials in New Zealand for soil cement and at Christchurch the Canterbury University College School of Engineering soil laboratory has made extensive tests on Cashmere Hills loess, which has been found very suitable for soil-cement construction. The deposits on the Cashmere Hills came originally from the Southern Alps, by the action of wind. Either of the soil laboratories mentioned will be able to advise whether material is suitable in a soil-cement mixture.

A great many of the outhouses and sheds on a farm could be constructed of soil cement. An article in the July, 1949, issue of the "Journal" by I. H. Owtram, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington, described the erection of pig houses, using concrete blocks. However, as soil cement requires only half the cement needed for ordinary concrete, a saving of cement, which is expensive, could be made by using soil cement for many outbuildings where great structural strength is not required.

Mixing Soil Cement

If soil cement is being made in quantity, it is best to mix it in a drum which is provided with rotating blades, because an ordinary concrete mixer is not satisfactory. However, as the farmer wants to be able to make small quantities at a time, a mixing board and shovels will be required. It is best to store the soil under cover which will keep out the rain so that the soil will not clod up. The worst clods, if there are any, can be crushed with the back of a shovel. To separate the clods from the fine material the soil is thrown on to a small-mesh, wire-netting screen as shown in Fig. 1. The fine soil drops through and the clods roll down the screen.

The amounts to be used are obtained as follows: Take any box 12in. deep and fill it with the soil that has passed through the screen. Empty the soil out on to the mixing board and place

An attractive Christchurch residence built with soil cement.

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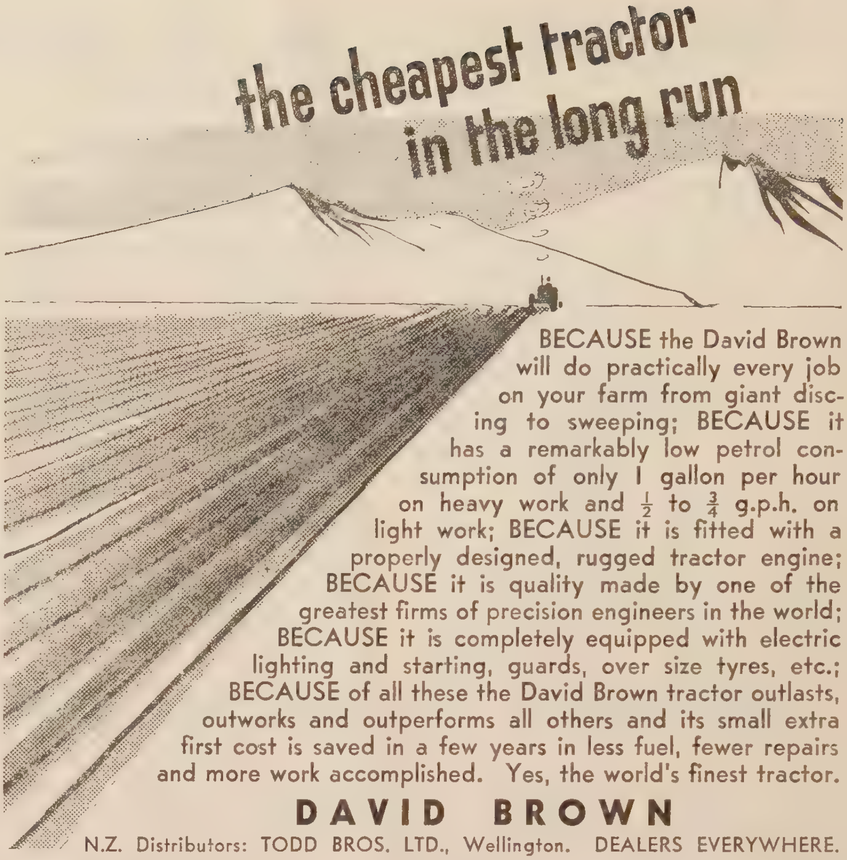

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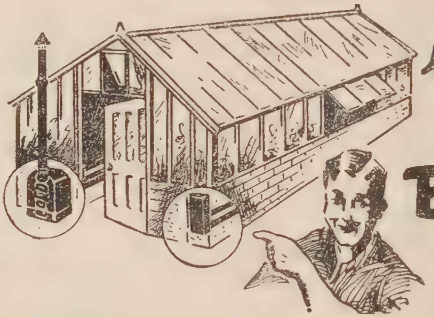

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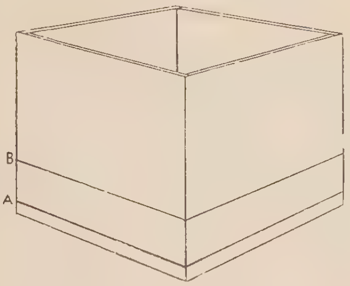


Fig. 2—Measuring box for soil cement which should be 12in. deep but of any convenient size. The mixture is measured as follows: Box once full of loose soil; to 1in. level (A) with cement; to 4in. level (B) with pea gravel.

1in. of cement in the box. Scatter the cement out on the soil carefully, place 4in. of small gravel (pea gravel) in the box, empty it on to the heap, and mix the three ingredients in the same manner as for ordinary concrete. Turn the mixture over in the dry state two or three times. Water may then be added, but great care should be taken when doing this, as on no account must the mixture be made too wet. There should be just sufficient moisture that when the mixture is squeezed in the hand the soil just clings together—actually 14 per cent. water by weight and 6 per cent. of cement by volume are required.

In New Zealand it is usual to construct floors above ground level, but is this essential? Of course if timber is used, it is necessary to have a good circulation of air, which is a disadvantage in keeping a house warm in winter. In districts subject to flooding it might be an advantage to have a higher floor. Apart from this there is no reason why a floor should not be placed on the ground and for such a floor a mixture of silty soil, cement, and sawdust can be used. First the humus soil is removed from the site and is replaced by large boulders or crushed rock. This foundation is covered with 2in. of silty soil and well rammed. A damp course consisting of bitumen and sand is spread over the soil. It is best to have this work done by an asphalting firm. Finally 2in. of a mixture consisting of 6 parts of soil, 3 parts of sawdust, and 1 part of cement is laid. This surface is finally covered with compressed-pulp wallboard and linoleum.

Making the Walls

The walls may be constructed on a concrete foundation, or, in an outbuilding where good foundation conditions exist, simply on soil cement. Whatever is used a damp course consisting of tarred roofing material should be placed slightly above ground level. The best way to construct the soil-cement walls is to ram the mixture between wooden shuttering (Fig. 3) in lifts of 2 to 3ft. As the wood used in the shuttering may be used again in the roof, no material is wasted. The thickness of the wall varies according to the height to which the wall is to be built, but for a height of 8ft., outside walls have been made 8in. wide and partition walls 6in.

Material should be rammed well as the walls are being built. Layers should be consolidated when each is not more than 2in. deep and it is essential to make sure that every part of the wall is reached. The boxing may be removed the day following placing, and the next lift continued. If the finished wall is not a colour that satisfies the individual taste, a cement plaster coat, which adheres very readily to the soil cement, may be applied. If timber is to be attached to the soil cement, ordinary nailing will suffice, as soil cement will hold nails driven into it in the usual manner. For house construction a reinforced concrete tie beam is placed around the top of the walls, but this would not be necessary for farmers' sheds and outbuildings.

Soil-cement Blocks

Soil-cement blocks have been tried, and this method of construction may perhaps appeal more to the farmer than the shuttering method. The blocks should be solid and 15in. to 18in. long, 8in. wide, and 8in. deep. A batch could be made in very simple forms such as the type shown in Fig. 4. Blocks should be made so that the forms can be removed with the minimum of inconvenience. Construction of these blocks could be a suitable wet-day occupation on the farm.

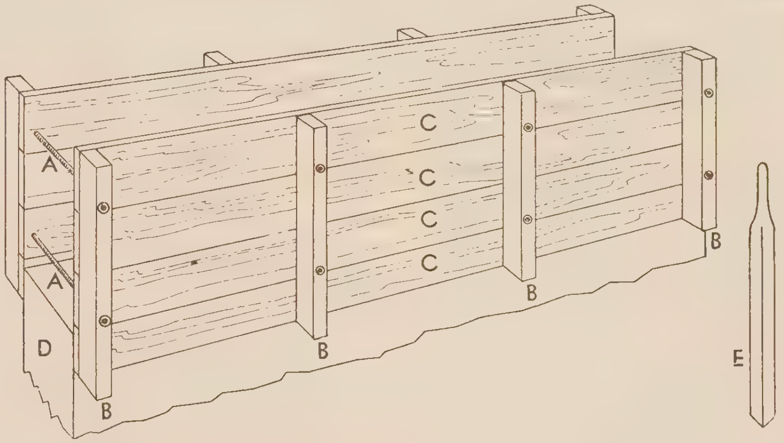
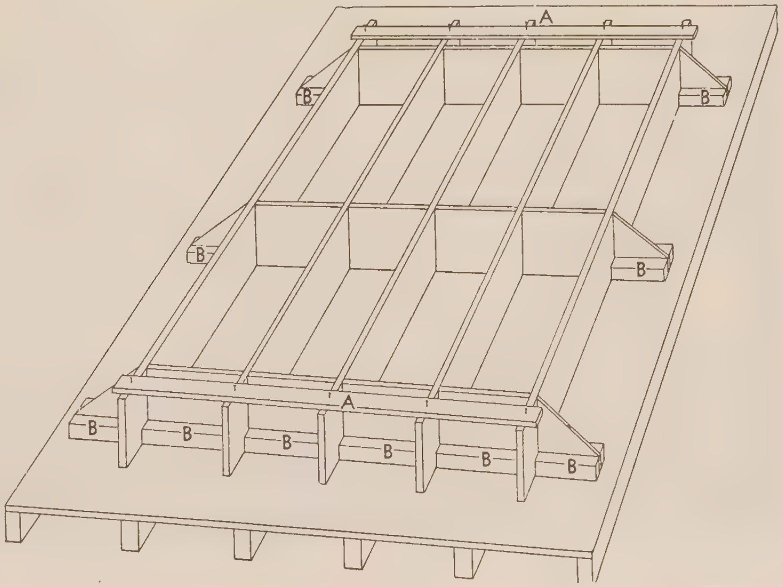


Fig. 3 (above)—Suggested shuttering for soil-cement construction of an 8in.-thick wall, and a rammer. A—$\frac{1}{2}$in. diameter bolts. B—4in. x 2in. timber. C—8in. x 1in. timber. D—Wall already placed. E—Rammer 4ft. 6in. long and 3in. x 3in. where it is squared.

Fig. 4 (below)—Forms in block making which are made so that they can be removed easily. Blocks can be made 15in. to 18in. long. A—3in. x 1in. battens. B—2in. x 2in. cleats. All other timber is 8in. x 1in.



Winter Work in the Apiary: Care of Equipment

Seasonal Notes for the Domestic Beekeeper

AN outline of winter work in the apiary and some of the aspects affecting the production of honey by the domestic beekeeper this season are given by R. Goddard, Apiary Instructor, Department of Agriculture, Tauranga, in this article.

NOW that all outside work in the apiary is finished the domestic beekeeper should devote some time to repairing and renovating equipment in readiness for the next honey season. To ensure long service from supers they should be well painted and stored where they are protected from wind and rain. Equipment left lying around the apiary not only will look untidy but will deteriorate rapidly.

It has been noticed frequently that domestic beekeepers have been using creosote to preserve supers. This practice is not recommended, and beekeepers are advised to paint supers and not to use creosote in apiaries. In hot weather the fumes from creosoted supers have been known to drive bees from the hive, and the honey may become so tainted that it is unfit for consumption.

All bee combs should be sorted and those containing excess drone brood discarded. When extracting operations have been completed all utensils should be cleaned of wax and honey and sterilised in boiling water. Check all honey-extracting equipment thoroughly, paying particular attention to extractor bearings, baskets, steam boiler, uncapping knife, all rubber tubing, and the uncapping unit. If repairs are necessary, these should be done and all equipment put away in readiness for the following season.

If an increase in the number of hives is contemplated, now is the time to procure additional equipment. It is good apiary practice to have at least an average of 4 hive boxes complete with sufficient frames for each hive. It is simple to calculate the number of supers and frames which will be required for future use. Supers and frames are generally received in the flat from the manufacturers, but they are easily assembled and nailed together. The frames may be wired, but it is advisable not to insert comb foundation until the weather is warmer, when the wax is more pliable, as breakages and much loss of comb foundation may occur.

Building to Standard Specifications

Although good standard hive equipment is available from various firms, beekeepers occasionally desire to make their own hive parts.

It cannot be stressed too strongly that all equipment manufactured by the beekeeper should be built to standard specifications. This is readily appreciated if, during hive manipulation, it is found that supers are not interchangeable. Apart from the extra work involved, colonies quickly lose their saleable value if hived in other than standard equipment. Measurements for this type of apiary woodware can be obtained from local Apiary Instructors.

[Rendell's Photo Service photo.

A domestic apiary well laid out and well sheltered.

This season there has been a great variation in the amount of honey produced by domestic beekeepers; some hives gathered barely enough to winter successfully, others produced a surplus of up to 100lb. or more of honey. Those beekeepers whose hives failed completely should endeavour to remedy the position next year. In this connection many claim that location of hives is the deciding factor in honey production and that those beekeepers who invariably manage to get reasonable returns are favoured with an abundance of floral sources for the bees to work. However, it has been noticed frequently that hives placed by domestic beekeepers in similar localities have shown a marked difference in the amount of honey produced.

Unfortunately the weather is often blamed for the faults of the beekeeper and his inability to carry out sound apiary practice. Weather conditions prevailing throughout the season do play an extremely important part in honey production: Good spring conditions followed by warm, sunny days with rain at suitable intervals should ensure good crops, but they do not always eventuate; even in bad beekeeping seasons there is always the beekeeper who gets a surplus crop from his hives.

Knowledge of Life History and Habits

Apiary sites and equipment, shelter for the bees, and weather conditions all play an important part in honey production, but to achieve success the domestic beekeeper must realise that correct hive manipulation at the right time pays well. Sound apiary practice and colony manipulation cannot be carried out unless the beekeeper has a good knowledge of the life history and habits of the honey bee. It is generally the beekeeper who has this knowledge and who is able to put it into practice who will get surpluses from the bees. Bulletin No. 267, "Beekeeping in New Zealand," obtainable at 2s. 6d. (post free) from the nearest office of the Department of Agriculture is a complete guide to colony and apiary management.

Proceedings of Ruakura Farmers' Conference Week

JUST published and containing addresses by experts on sheep and dairy farming, the "Proceedings of the Ruakura Farmers' Conference Week," a book of over 200 pages, is now available at 10s. (post free) from Publications Section, Department of Agriculture, Box 3004, Wellington. The conference was held in the last week of June, 1949.

As well as giving the lectures on the many different subjects in detail and with illustrations, the volume has the advantage that it contains a complete record of the questions put to the speakers by farmers and the answers. Because the subjects before the conference were vital and topical, there is much to be gained from a study of the discussion sections alone.

Wintering Pigs

CARRYING pigs through the winter when no dairy by-products are available is necessary if maximum returns are to be obtained from pig production on a dairy farm. In this article I. H. Owtram, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington, deals with this problem.

Sows and litters should be let out on to good pasture whenever the weather is suitable.

THE New Zealand dairy farmer who produces pigs—and most pigs produced in this country come from dairy farms—is faced with a problem that arises from the fact that pigs have two peaks of production each year and dairy cows only one. This problem is the provision of food for the pigs during winter when the cows are dry. In any case breeding stock have to be fed, and, if the maximum profit is to be made, a number of pigs that will eventually reach the freezing works must also be fed during winter.

By careful arrangement of the farrowing dates of sows the number of pigs to be wintered can be kept reasonably low. It has been found that the most economical times to farrow sows on the average dairy farm are in May and November. By adopting these farrowing dates it becomes possible to get two litters of pigs away during the dairying season. But sows farrowing in May, and their litters too, must be fed until the cows come in. In addition it may be necessary, owing to the rapid rise in the quantity of skimmed milk available when cows start to calve, to have one litter of bigger pigs on hand to cope with the sudden increase in the supply of feed in spring. Again, the farmer who is handling pigs in a larger way than the average dairy farmer through having a buttermilk supply from a nearby factory or a large supply of cheese whey must winter a considerable number of store pigs to deal with the spring supply of feed or he is forced to try to buy suitable pigs in spring when prices for this class of animal have reached a most uneconomic level, and to buy stores at these prices means a loss of profit.

There are two sources of food for pigs in winter on a dairy farm: It can be bought in or it can be grown on the farm. Although a certain amount of food has to be bought, it is more economical, and so more profitable, to produce as much as possible in the form of home-grown crops. What crops can be grown depends on the situation, type of soil, and climate.

Home-grown Crops

There are three groups of crops suitable for feeding to pigs: Concentrates, semi-bulk foods, and bulk foods. This division is related to the food units which the different foods contain. In New Zealand 1 gallon of skimmed milk is taken as the standard food unit; other foods are related to it. Thus 1lb. of concentrates or less is the equivalent of 1 gallon of skimmed milk in food value. Semi-bulk foods are those of which 5lb. are equivalent to 1 gallon of skimmed milk, and bulk foods those of which 10lb. are equivalent to the standard unit.

Though this division is not strictly accurate, it suffices for practical purposes in calculating the amount of food required.

Three groups of crops can be grown on farms for pig feeding. They are:—

Concentrates: Barley, maize, and peas, when harvested as grain.

Semi-bulk foods: Sugar beet, artichokes, and potatoes (cooked).

Bulk foods: Mangolds, pumpkins, carrots, swedes, turnips, chou moellier, silver beet, good clover pasture, and lucerne.

All these crops except potatoes are grown for pigs. The potatoes used for pig feeding are always the waste from commercial crops and are available only where commercial plantings are made.

It is essential when choosing a crop or crops to decide which are suited to the locality. Then if it is practicable, a grain crop (concentrate) should be grown, and in addition a crop in the semi-bulk or bulk groups. There are great advantages in growing grain crops, which represent a substantial saving as against the cost of bought-in grain or grain meal at today's prices, and the benefit to the pigs of providing them with a better-balanced ration is enormous. Harvesting is not a problem. Maize can be fed on the cob and barley or peas can be cut with an ordinary mower and stacked or baled; the pigs will do the threshing most efficiently.

Sugar Beet Best

Sugar beet is the best of all root crops where it can be grown successfully. Its high food value, palatability, and the ease with which it can be fed—it can be fed straight out of the ground, and tops as well as roots are good food—put it in a class by itself. Sugar beet should be used more widely by pig producers, as it can be grown satisfactorily in most places. However, in many cases, crops such as swedes and chou moellier are grown on farms for animals other than

Pigs grazing on chou moellier.

pigs and could be used as pig food. The use of such crops for feeding pigs is fully justified.

Even where maximum use of home-grown crops is made, some food must be purchased. Meat meal is a proved food; its digestibility, high protein content, and small bulk for food value render it almost a necessity for the successful wintering of pigs, particularly young pigs. Molasses is another food of considerable value; only small quantities need be fed. This applies also to tallow, which has been more widely used recently and is extremely useful despite its high price.

Utilisation of Feed

If all the sows on the farm are farrowing within a short period at this time and cows are not due to calve until the end of July, the early-May litters will be of sufficient size and sufficiently numerous to cope with the rapidly rising supply of skimmed milk in spring, especially if a number of calves are being reared. Under these circumstances it is not necessary to winter any store pigs.

This system of management is undoubtedly the most economical and enables the farmer to get two litters from each sow away during the season.

A litter of 10 pigs on the sow require considerably less food than 10 store pigs, and with sows farrowing at the beginning of May the litters are on the mother for the greater part of the winter. The requirements of a sow suckling a litter are at least 4 food units a day for the sow's maintenance and 1 unit for each piglet. The food can be supplied in many ways, but it must be realised that it cannot be supplied solely in the form of bulk food. No sow, for example, is capable of consuming and digesting sufficient swedes to provide her with adequate nourishment for herself and the litter she is rearing. Part of the ration must be concentrates—grain or grain meal, meat meal, and tallow. The importance, too, of access to good pasture for both sow and litter cannot be overemphasised. If a small quantity of skimmed milk is available, as is the case on most farms in winter, it must, of course, be used and allowed for.

Creep Feeding

Creep feeding of litters must begin when pigs are 3 weeks old, and once litters are feeding in the creep any milk that is available should be reserved for them, as this is where it can be used most profitably. Satisfactory creep feeding of litters in winter calls for the use of meat meal, grain, and a little tallow. Owing to the small quantity consumed by piglets this is not as costly as might be supposed. A very important point that is frequently overlooked is the provision of water to drink. This is necessary at all times, but especially when little or no milk is being fed. A continuous supply of clean drinking water should always be readily available.

Meals—meat meal and cereal meals—can be fed dry, but it is probably more economical to feed them with water as a slop. If molasses is being used, it can be added to the water used to mix the meal. It is far better to use at least half, if not more, of the daily ration of concentrate as the last feed of the day. The value of this can be seen readily by noting the difference between pigs settling down for the night after a feed of meat meal, grain, or tallow and after a feed of swedes.

Turning Pigs out on Crops

Where store pigs are wintered and suitable crops have been grown pigs can be turned out on to the crops during the day and brought in in the evening and given meal and a little tallow. Suitable crops are swedes and chou moellier, and as these crops are usually grown in fairly large areas, there is little waste. Pigs can also be run on paddocks of maize and pumpkins and roots other than swedes, but the higher the feed value of the crops grown the more wasteful is this method of feeding. In deciding whether pigs should be turned out on to crops a balance must be struck between saving in labour and waste of food.

Pigs should never be turned out on mangolds, which must be pulled and ripened for at least 6 weeks before being fed; otherwise there is a risk of mangold poisoning, of which there have been cases in the past.

Care of Boar

In wintering pigs an important point, and one that is often forgotten, is care of the boar. Far too often the boar is turned out to fend for himself to a great extent. When it is realised that winter farrowing of sows means that the boar will be required for use at the end of the winter it becomes obvious that it is important to give him good treatment and feed him well.

Finally, in the wintering of pigs consideration must be given to housing; dry, warm sleeping quarters are essential, and bedding should be provided. Too often the necessity for keeping pigs warm is overlooked. Houses should be designed so that pigs are kept warm and also so that the owner has complete control over them. In winter it is important to be able, when desired, to keep pigs shut in.

The main points in wintering pigs are to make, wherever possible, ample provision for them in the form of home-grown crops; to plan the breeding programme so that the minimum of pigs has to be wintered; to provide adequate housing in which pigs can sleep dry and warm and in which they can be controlled; to feed pigs well on a ration which is as well balanced as possible; and, not least, to maintain the boar in good condition.

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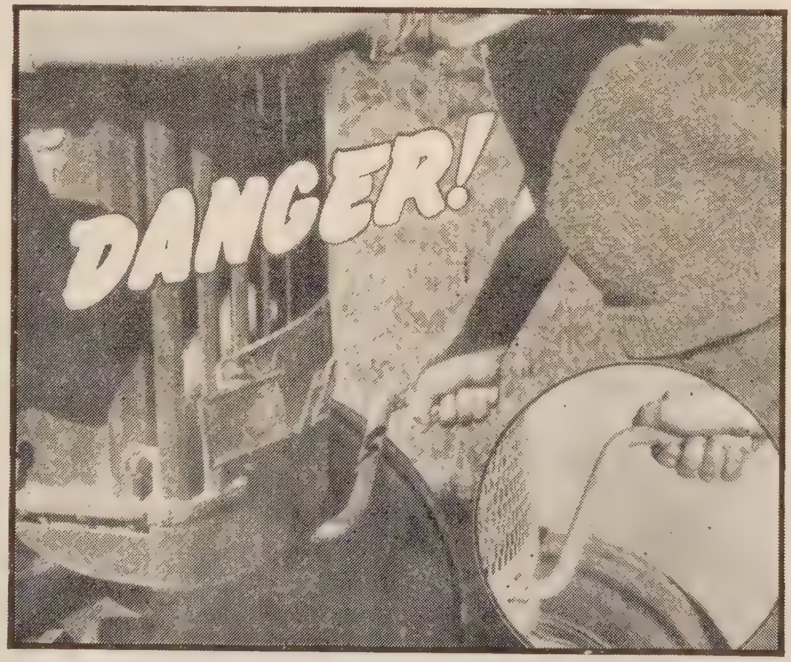


THERE is a right and a wrong way of carrying out most operations with machinery, and the wrong way often leads to an injury to the operator. Failure to learn the correct procedure places an operator in grave danger of what may be a fatal accident every time that operation is performed. For example, by placing his thumb round the handle instead of keeping it parallel to his first finger as in the inset the man cranking this tractor has placed himself in jeopardy of an injury ranging in severity from a sprained thumb to a broken arm. Most accidents can be avoided, and one way in which this can be done is to carry out all operations in the correct manner and order.

—*C. J. CROSBIE, Farm Machinery Instructor,*
Department of Agriculture, Christchurch.

Flower Gardens Need not be Colourless in Winter

By C. K. ELLIS, Horticultural Instructor,
Department of Agriculture, Dunedin.

NEW ZEALAND, on the whole, is a fortunate country climatically, and the average gardening enthusiast could wish for little better. In spring, summer, and autumn flower gardens are ablaze with colour, but with the coming of winter most of them fade and become dull and bare. The underlying cause of this may be difficult to detect, but it is sure that a little extra thought and care in planning would do much to improve the situation.

WHEN the background for a garden is being chosen the devastating effect of cold winter winds on a large number of plants must be remembered. Most household flower gardens are so small that hedges must be relied on for shelter, and in only a few gardens can trees be considered for this purpose. A sound practice is to place the tallest-growing species at the greatest possible distance from the house, where their habit can be appreciated best, and grade the planting until the lowest-growing species occupy the front of the area.

For the larger garden many small-growing trees are well suited. Of the deciduous species the better known and most usually successful include the rowan (*Sorbus aucuparia*), the maple (*Acer campestre*) and varieties, the laburnum (*Laburnum vulgare*), and species of the *Prunus*, *Pyrus*, and *Crataegus* genera. Suitable evergreens include the yew (*Taxus baccata*), the juniper (*Juniperus communis*), the arbor-vitae (*Thuya orientalis* or *T. dolobrata*), the box (*Buxus sempervirens*), and many of the native species of New Zealand.

However, such tree planting is rarely possible in towns and hedges must be resorted to. Many types are possible, but the variation in species in common use is not as great as it might be. An occasional hedge of yew or of evergreen oak (*Quercus ilex*) would please the eye; both will thrive in most parts of New Zealand, though the oak might prove a little too frost tender in some of the inland regions. Hornbeam and beech, both deciduous, also form excellent hedges and are quite colourful through the winter, for they both retain their dead, russet-brown leaves almost until spring.

The background, then, should be the main consideration in planning a garden for winter effect.

Garden walls or the north walls of a house provide invaluable opportunities for winter gardening, for there can be found shelter for a multitude of winter-flowering shrubs and herbaceous plants. Paths must also enter into initial planning, for, whether they are of stepping stones, crazy paving, or bricks, they provide something solid underfoot and greatly reduce the hazards of walking when the ground is soft and wet.

The question of maintenance during winter should not be weighed too heavily in planning, for it is of little real importance. A little pruning and an occasional mowing of the lawn is about all that is necessary, for most plants of value in winter need attention only once a year, and some not even that. An unbroken sweep of lawn, rather than small patches, reduces work even further.

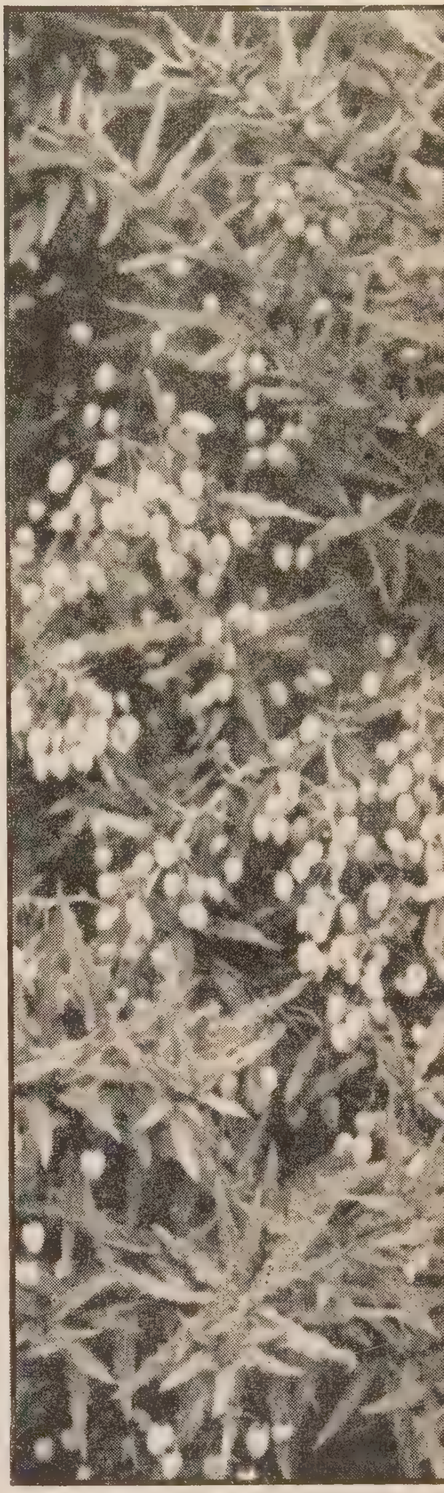
Berry-bearing Plants

May and June are the dullest months in the average garden, and at this time of year berry-bearing trees and shrubs are of great advantage. Red seems to be Nature's favourite colour in berries, but there is a great range, including blues, purples, yellows, oranges, and white, which can all be obtained with equal ease and in equal perfection. Wind and birds are the greatest enemies of berry bearers, but the use of one of the recently introduced fruit-holding hormones helps greatly to defeat them. The effect of this hormone is to prevent the development of the abscission layer in the stalk of the fruit, thus making it difficult for the berries to be blown off or pulled off by birds.

The gardener may choose from a tremendous number of such trees and shrubs.

Of the trees, perhaps the finest are among the members of the genera *Sorbus*, *Crataegus* (thorns), *Ilex* (hollies)—especially *I. perneyi*, for its beauty of foliage as well as of berries—*Pyracantha*, and *Cotoneaster*. *Berberis darwini* and the well-known *Arbutus unedo* (strawberry tree) are others well worth consideration. Few are as pleasing to the eye as *Idesia polycarpa*, which bears berries ranging from orange-yellow to purple, but it has the disadvantage of being dioecious—that is, having separate male and female plants.

Berrying shrubs are even more numerous than the trees, and in some ways are even more attractive. *Berberis canadensis* is a deciduous shrub bearing red fruits through the winter, and in the genus *Cotoneaster*, *C. frigida* bears crimson berries, its variety *fructo luteo* yellow ones, and *C. glaucophylla* orange-red fruits and attractive blue-green foliage. Unfortunately, one of the best of the genus, *Cotoneaster serotina*, is particularly susceptible to the disease known as fireblight and therefore is not recommended for planting, especially in fruit-producing districts. *Pernettya mucronata*, which is intolerant of limy soils, bears berries ranging from white to red and purple, and *Ruscus aculeatus* (butcher's broom), which has male and female plants, produces berries of bright red. *Pyracantha rogersiana* carries a profusion of bright orange berries.



[*Douglas Elliott photo.*

The bluish-black berries of *Berberis gagnepaini* are set off attractively by the plant's dark green foliage.

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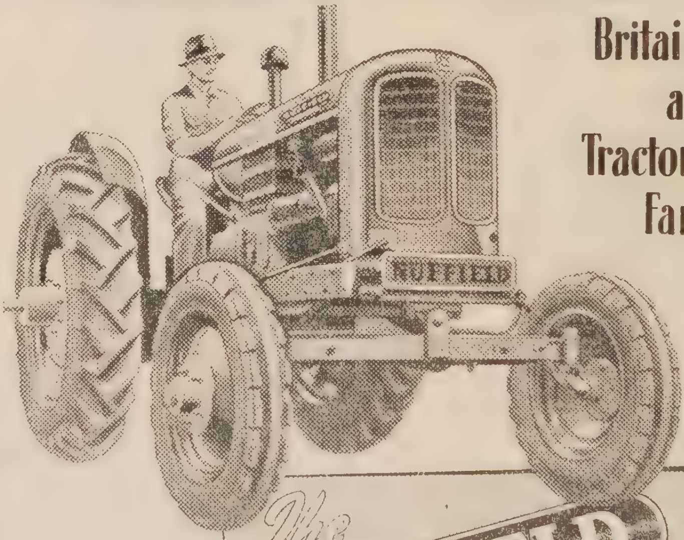

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An evergreen climber, *Billardiera longiflora*, a native of Tasmania, is recommended for its large blue berries and thrives in a warm position in full sun.

Colourful Bark and Twigs

Only a few species have brightly coloured bark, but much winter decoration may be found among the twigs.

Of the trees with colourful bark undoubtedly the best known is the birch. Some of the many species and varieties are better than others. The Swedish birch (*Betula verrucosa* var. *dalecarlica*) has a beautiful white trunk and drooping branchlets. An American species, *Betula papyrifera*, is more erect in growth and larger at maturity. One of the most ornamental of the birch genus is the Japanese (*Betula maximowiczi*), which in winter has bark of glowing orange.

Acer griseum (grey Chinese maple) is a tree of 30ft. and its trunk in winter has dark red-mahogany bark peeling back in flakes, revealing bright coppery-orange bark beneath. *Prunus serrulata* var. *tibetica* has the same appeal in that its older mahogany-coloured bark peels off, uncovering younger bark of polished bronze hue.

Salix vitellina var. *pendula* is the most beautiful of the weeping willows, having long, slender, golden-yellow stems throughout the winter. *Salix magnifica*, an upright species, has purple young growths during the cold months.

[*Douglas Elliott photo.*

The witch hazel *(Hamamelis mollis)* is one of the finest of the winter-flowering trees and shrubs. The flowers are yellow and sweetly scented and are borne when the leaves are absent from the branches.

[*Douglas Elliott photo.*

Viburnum rhytidophyllum, a large-leaved, striking, evergreen shrub, is excellent for screening an unsightly corner or object if given a sheltered position. It is a vigorously growing shrub eventually attaining a height of 10ft. and more. The leaves are attractively corrugated, glossy green above and with a greyish tomentum underneath. The small white flowers born in large trusses begin to develop in late autumn and are carried through the winter. The berries are bright red changing to black, and a bush in full fruit is a fine sight. To ensure a full production of fruit cross-pollination of the flowers is necessary, and for this purpose two bushes should be planted near each other. The variety *aldenhamensis* has golden foliage, the leaves at first glance appearing as if they have been dusted with gold; it is a shrub that can be recommended for the flower garden.

For the more brilliant colours little can be better than the dogwoods (*Cornus*). *C. alba* has stems which turn brilliant red in autumn, its variety *sibirica* has crimson stems, and in contrast variety *stolonifera flaviramea* displays bright yellow.

Conifers

Most conifers are evergreens, notable exceptions being the larch (*Larix decidua*), the maidenhair tree (*Ginkgo biloba*), the swamp cypress (*Taxodium distichum*), and the recently discovered *Metasequoia glyptostroboides*. The evergreen species are of the greatest value in winter, for during this season, whether they are green, grey, blue, or gold, their colour is intensified.

Nevertheless, conifers must be planted only after full consideration of the purpose they are to fulfil. They vary considerably in ultimate size and if planted foolishly may envelop the garden in a gloomy darkness. The taller species are for the larger gardens only, but for the small garden a pleasing selection can be made from a wide range of small-growing species.

Winter-flowering Trees and Shrubs

Among the trees and shrubs are perhaps the most valuable of all plants for brightening the garden in winter. There are many such species, mostly natives of the colder parts of the world, and probably the mildness of New Zealand winters causes them to bloom earlier than they would in their natural habitat. Most of these species bear highly scented flowers, which adds to their desirability as garden

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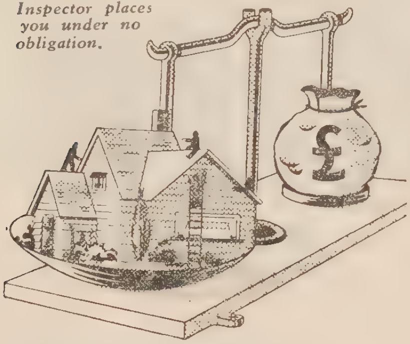

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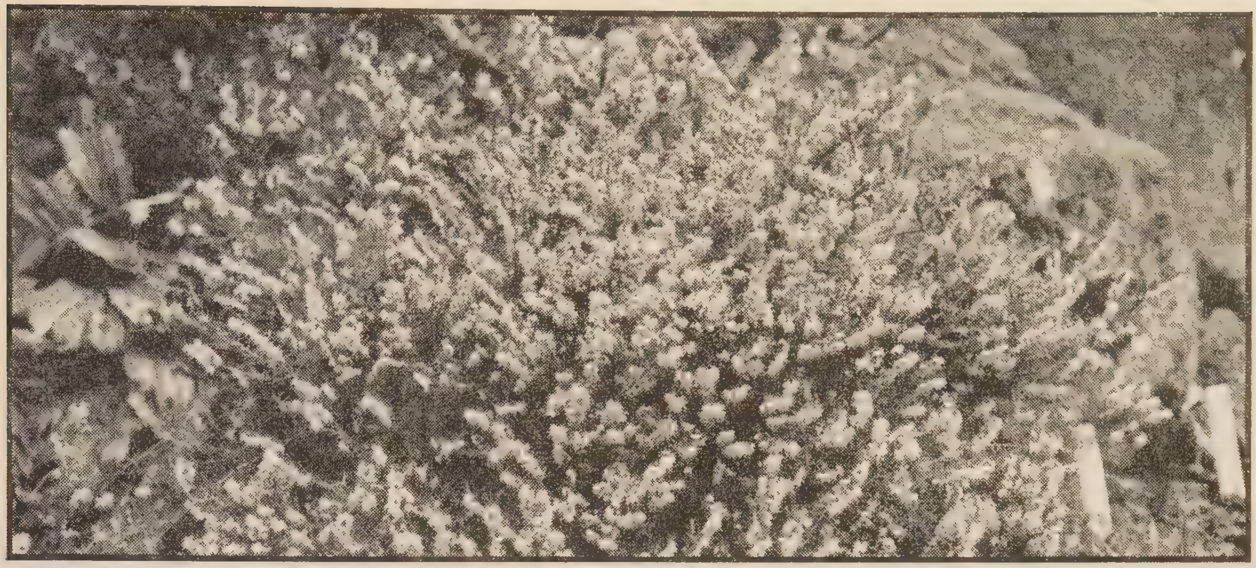


[*Green and Hahn Ltd. photo.*

Erica darleyensis begins to bloom in June and continues throughout the winter.

plants. Given reasonable care and attention, few of them fail to give satisfaction.

Probably the most pleasing of such trees, *Azara microphylla,* which needs a rather milder climate than most, has scented, yellow flowers in July. Some members of the *Prunus* genus, such as *P. communis* var. *pollardi* and *P. davidiana,* are well worth planting.

The shrubs are more numerous and in general more suited to the home garden because of their smaller size. A few of the better-known species are *Chimonanthus fragrans* (winter sweet), which bears sweetly scented, yellow-white flowers in June and July; *Daphne mezereum,* with its scented, purple flowers on leafless stems about July; *Hamamelis japonica* and *H. mollis,* with scented, yellow flowers; and *Jasminum nudiflorum,* which carries star-like, yellow flowers sporadically throughout the winter. *Nuttallia cerasiformis* bears sprays of greenish-white blossoms on leafless stems; the flowers are highly and sweetly scented—in fact, almost overpoweringly so. *Viburnum fragrans* and a few of its close relatives, with their clusters of tubular, white flowers in late winter, and *Garrya elliptica* (the male plant), with its long, grey-green catkins, are others well worth consideration.

The Heaths

The heaths, or more correctly ericas, can provide the winter garden with masses of pink, white, and red. However, only a few small groups within the genus are truly winter flowering. *Erica carnea* and its varieties comprise the main group, and fortunately none of them is very particular about soil. The presence of lime does not affect them. Apart from this group, *Erica darleyensis* flowers over the longest period, bearing masses of tiny, coral-pink flowers from June onward.

Calluna vulgaris var. *hiemalis,* a low-growing near relative of the ericas, needs a lime-free soil, but its sprays of pale lilac flowers in mid-winter make it well worth the effort of growing it.

The heaths are ideal plants for the home garden, for they are reliable and need little attention. Pruning is not essential to encourage flowering, but is necessary to shape the plants and produce vigorous young growth. It should be done immediately after the plants have flowered and should consist of little more than removing wood which has flowered.

Border Flowers and Bulbs

No matter what else is in the garden, it is not unusual for the owner's chief winter interest to be the flower borders and bulb plots. These he surveys daily with an air of expectancy. Of the truly winter-flowering border plants there is, it must be admitted, a paucity, but late winter and early spring bring a wealth of beautiful, dainty, and often highly coloured flowers in wide variety. To these plants most garden-minded people look for the first signs of the new garden season.

The late-flowering chrysanthemums in a good season may provide colour until June, but the Korean varieties are probably more satisfactory and reliable.

The kaffir lily (*Schizostylis coccinea*) bears spikes of crocus-like crimson flowers which do much to brighten the winter scene.

Among the few herbaceous perennials commonly seen blooming in the heart of winter are the hellebores, the earliest into flower being *Helleborus niger*, known in England as the Christmas rose and in New Zealand as the winter rose. There are several varieties of this species, all equally hardy and valuable. The later period of winter is the flowering time of such others as *Helleborus orientalis, H. viridis,* and *H. corsicus* (syn. *lividus*).

The crocus is probably the best known genus of early-flowering bulbs, the earliest of these undoubtedly being

Chrysanthemum stools boxed and placed outside. New shoots suitable for taking as cuttings are beginning to grow.

WORK FOR THE FLOWER GARDENER IN JUNE

A hydrangea plant which was pruned correctly during the previous season.

Crocus imperati. A long display by the many other species and varieties follows.

Galanthus nivalis and *G. byzantinus* are the better-known species of snowdrop, and of the winter-flowering irises *I. stylosa* (*unguicularis*) is surely the most widely known and popular. *Iris alata* is among the first to flower, but it is quickly followed by *I. bakeriana* and *I. reticulata* and its varieties.

The winter aconites, *Eranthis hyemalis* and *E. cilicica*, do not seem to be grown widely; nor do the winter-flowering cyclamen species, probably the loveliest of which is *Cyclamen coum*, with its slender stalks no more than 3in. long and delicate, crimson-pink flowers.

Scilla bifolia, Scilla sibirica, Chionodoxa luciliae, and *Tulipa kaufmanniana* are others of the multitude of late-winter and early-spring flowering bulbs.

Garden Work for June

Begonias (tuberous rooted) for greenhouse display can be raised from seed sown in June. A finely sieved compost is necessary, as the seeds are extremely small, and boxes or pans in which seed has been sown should be kept in a greenhouse at an even temperature and with adequate moisture. Named varieties can be propagated only from cuttings taken during summer.

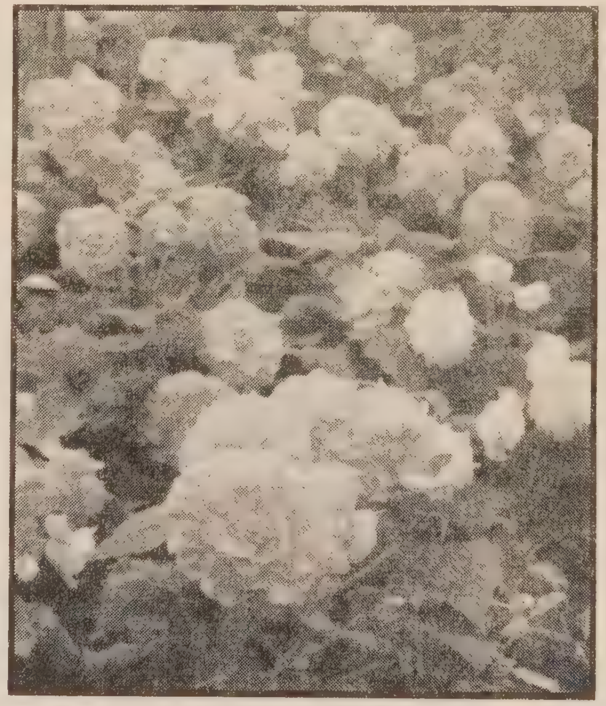
Chrysanthemums grown in pots should be cut down almost to the bases of the stems immediately after they have flowered. Any long suckers of late growth should also be cut back and the pots placed outside in a light and airy position. The plants may be knocked out of the pots and grouped in boxes before being put out. As soon as strong new growths are about 4in. long they may be removed as cuttings for propagating next season's plants.

Cultivation of herbaceous perennial borders and shrub gardens should never be neglected. "Pricking over" is the best method in all semi-permanent areas of garden, because it enables root damage to be avoided. It consists of going over the ground with a garden fork, turning over the surface soil but holding the tool always at a low angle so that the tines are not permitted to penetrate too deeply. The soil is left lumpy, no attempt being made to break it down.

Hydrangeas can still be pruned. Weak shoots should be cut out and strong new ones that have not flowered should be left untouched. Shoots that have flowered should have the flowers removed and be shortened back to the length desired.

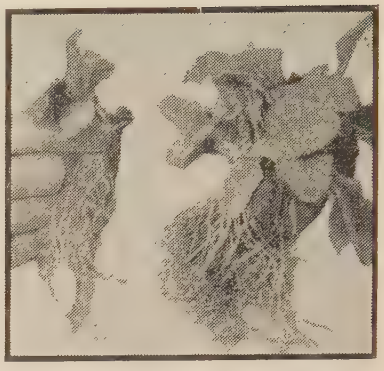
Lawns, like flowers, shrubs, and trees, must be fed, and except in the coldest regions a winter dressing should be given now. A mixture of 3 parts of sulphate of ammonia, 1 part of superphosphate, and 1 part of sulphate of iron is the best dressing, applied at the rate of 1oz. per square yard of lawn. This should be done 3 or 4 times a year.

Seed of lobelia and antirrhinum may be sown in June in boxes and given the protection of a greenhouse or cold frame. If such cover is not available, the box should be placed in a sheltered position with a sheet of glass over it. A good plan is to keep strong light out by placing a piece of heavy paper or scrim over the box, but this must be removed soon after the seed has germinated or the seedlings become "drawn" and weak.



[*Douglas Elliott photo.*

Begonias grown from seed or cuttings make a fine summer display in a greenhouse. Seed may be sown at this time of year.



[*Photo News Ltd. photo.*

Old polyanthus plants may be divided as illustrated and replanted in June.

Spring-flowering bedding plants can still be planted in June in the milder districts if the soil is in suitable condition. Forget-me-nots, wallflowers, primroses, polyanthus, and sweet william are useful. Old polyanthus plants and other herbaceous perennials can be multiplied by pulling them apart and planting each crown.

Stakes and labels are expensive garden items, but if treated properly they should last many seasons. During winter a little time may be spent on them. The parts that are to be in the ground should be treated with some preservative, such as creosote, and any labels requiring rewriting attended to. Labels will remain legible for several seasons if they are printed with a soft lead pencil on a background of flat white paint while it is still wet.

Sweet pea seed can still be sown in boxes and germinated in a cold frame or greenhouse. The soil may be prepared in the sweet pea bed, too, for it is advantageous to let it settle for some time before planting out the seed.

Trees and shrubs can be planted in June if the soil is not too wet or too cold. If the plants should arrive from the nurseryman during such an unfavourable period, it is best to unwrap them, soak the roots well in a tub of water, and heel them in in a sheltered position to await the return of more favourable conditions before they are planted out in the permanent positions.

Weeding is a task that should never be neglected, for weeds are usually the most vigorous inhabitants of the garden, and once they get out of hand they become quite a problem. The simplest way to overcome them is to pull them out whenever they appear among the plants and to hoe them down regularly in the more open portions of the garden.

SAVING POWER ON AN ELECTRIC RANGE

New Zealand's power-supply problem has been a serious one for some time, and several more years must pass before power boards and electricity departments will be able to urge customers to an unrestricted use of current. In the meantime any savings which can be made in the operation of one of the heaviest domestic users of power—the electric range—contribute not only to economy in the household budget but to the national economy. Here Edith G. McNab, Rural Sociologist, Department of Agriculture, Dunedin, offers some suggestions to assist in achieving that end.

ELEMENTS should be turned to low when saucepans on them boil. When food is being cooked in water, harder boiling does not raise the temperature any more and the extra heat is wasted in evaporating the cooking liquid.

COOK as much as possible with the lids on saucepans. Uncovered saucepans mean more loss of heat through evaporation.

OVEN space may often be planned to accommodate at one time two or more foods which require the same cooking temperature—for example, meat and vegetables for a meal, or even a complete two-course meal.

NO more water than is required to prevent burning should be used when cooking vegetables. Extra water only wastes heat. (As little water as possible is good practice from the nutritional point of view, too.)

OVEN temperatures increase slightly in some stoves after the switches have been turned off. A cook who learns to know her oven well can make use of this fact.

MUCH heat is lost by a pan with an uneven base or when a small pan is used on a large element. Choose a saucepan which covers the element and has a flat base which will come into close contact with it.

INSTEAD of preheating it each time, plan to use the oven for two or more lots of food. Cook the one requiring the highest temperature first.

ENOUGH heat to keep a pan boiling for some minutes is retained by an element after the power has been switched off. Therefore an element can be switched off for the last few minutes of cooking time.

SPECIAL saucepans should be used when possible—for example, pressure cookers (which reduce the time for which heating is necessary), steamers (which will cook two or more foods at one time over one element), and triple saucepans (three triangular pans which fit together on one element).

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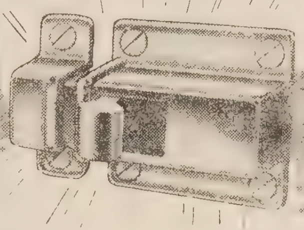

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Home-grown Foods as Factors in Nutrition

By EVELYN E. MOORE, Rural Sociologist,
Department of Agriculture, Palmerston North.

SUCH pleasures as the first meal of tender green peas or luscious strawberries of the season fresh from the home garden probably play no inconsiderable part in many New Zealanders' enjoyment of summer. In addition, it is generally assumed that such foods have not only a superior flavour but a superior nutritive value, particularly since the discovery that the vitamins in some foods are destroyed readily under certain conditions of treatment and storage.

[*Sparrow Industrial Pictures Ltd. photo.*

THIS supposedly greater nutritive value of home-grown foods has been investigated with interest by dietitians and others, for the first of the two most important factors to consider in any dietary—its calorie content (energy value), properly distributed between carbohydrate (starches and sugars), protein (meat, eggs, milk, etc.), and fat—has been shown to be relatively constant for any given food in an edible condition, but the second—its vitamin and mineral content—has been shown to vary considerably. Though results of research have shown in which ways the most food value can be obtained from home-grown foods, they have also shown that some effects, including that of fertilisers, have been exaggerated somewhat.

As yet insufficient is known of the ways in which the factors interact to make possible a statement of the best methods of producing and treating food for nutrition, though sufficient progress has been made to show that in the ordinary well-balanced menu these differences are extremely unlikely to produce a diet lacking in any one nutrient. In fact, that is one of the important arguments in favour of a varied diet, as eating foods which for some reason have lost part of their nutrient content is then much less likely to affect the nutritive value of the whole diet. However, the avoidance where possible of conditions of storage and treatment which are known to diminish the nutrient content of foods seems a reasonable aim, especially when such foods are scarce or expensive and the minimum quantities for adequate health, rather than those recommended as likely to produce the best possible health, are all the housewife can afford.

The factors most widely investigated and most commonly noted as affecting the nutritive value of foods may be divided approximately into three groups:—

- Factors important during the growing and ripening period of fruits, vegetables, and cereals or in the feeding of poultry and cattle.
- Factors important after harvesting, including methods and times of storage.
- Factors important during cookery. As these are often responsible for the greatest loss in nutritive value, as well as being possibly of the most interest to the housewife, they will be considered separately in a later article.

Fertilisers and Soils

The fact that large areas of land in many parts of the world may become useless for agriculture if immediate steps for their conservation are not taken has provided material for controversy not only about the best methods for restoring their fertility but also about the effect of such soils, before and after their restoration to a productive level, on the nutritive value of foods grown on them, and thus either directly or indirectly through the consumption of milk, eggs, and meat on the health of mankind.

However, results of careful experimentation show that, though soil conditions directly influence the nutritive value of crops—for example, a marked deficiency of a mineral in the soil frequently is reflected in a reduced amount of that mineral in a crop—there is no evidence that the application of artificial fertilisers decreases in any way the nutritive value of food crops.

Therefore, farming practices which encourage plant growth also tend to produce plants of high nutrient content. For example, the addition of lime to lime-deficient soils not only increases plant growth but also increases considerably the amount of lime or calcium in the crops grown.

The effect of topdressing on the non-mineral nutrients in plants, and indirectly on associated animal foods, is much less clear. However, though deficiencies of nitrogen and certain minerals have been shown to have a slight effect on the vitamin, protein, and possibly energy value of plants, these differences are unimportant compared with those caused by climate and plant variety and the more readily controllable ones of ripeness when picked and storage time and temperature.

Thus the home gardener may be confident that, no matter how unpromising the soil available may be, no practice which builds up soil fertility at the same time reduces the nutritive value of the crops. The nutritive value of food grown on poor soils compared with that of foods grown on fertile soils is not nearly as low as is often supposed, and such foods may be eaten with confidence that their general effect on health will be beneficial provided that deficiencies of certain nutrients are made up in other ways—for example, the addition of iodised salt to the diet offsets the widespread deficiency of iodine in New Zealand soils.

Climate and Situation

The effect of climate on the nutritive value of plants can be of only theoretical interest to the housewife, for it is one of the factors which cannot be controlled.

It has been shown that clear, sunny weather favours higher vitamin content in plants (plants growing in sunny positions contain more vitamin C in particular than those growing in shady places) and that plants grown outdoors contain more vitamin C than those grown in hothouses (hothouse tomatoes may contain only half as much vitamin C as outdoor tomatoes). The garden on a warm, sunny slope not only has better growing conditions but also tends to produce plants of higher nutritional value. The effect on the content of other nutrients, though still to be investigated thoroughly, is probably less.

However, the advantages which climate may bestow are small compared with those obtained by having garden-fresh vegetables and fruits available for immediate use. Even in parts of New Zealand where the climate or soil is unfavourable the home gardener may rest assured that the extra effort necessary to grow vegetables or fruits is more than repaid in the better-quality foods available for the family.

Plant Variety

The improvement of the nutritive value of food by specific selection from varieties high in nutritive value is as yet in its infancy, for high nutritive value alone is of little use if it is associated with poor flavour, size, or yield or a lowered resistance to disease. The experimental work being carried out in America along these lines is showing promising results, and it seems that within a few years varieties of fruits and vegetables with a much higher nutritive value than the average at present will become available.

Even now some outstanding varietal differences in nutritive value exist, probably the best-known example being Sturmer apples. Reliable experiments have shown them to contain about twice as much vitamin C as the average of other varieties—that is, about a seventh of the daily need of vitamin C is present in one average Sturmer apple.

Other foods with definite differences in nutritive value between varieties include carrots (white carrots have no vitamin A value, but the yellow varieties are excellent sources of this vitamin) and cabbages (young, green, spring cabbages provide about twice as much vitamin C as white-hearted varieties and much more vitamin A). Red tree tomatoes contain more vitamin C than yellow ones.

Ripeness and Maturity

The necessary practice of picking unripe fruit for marketing has often been claimed to detract considerably from its nutritive value. Fortunately, however, the main process in ripening of fruits is the conversion of much of the starch originally present into sugar. Mineral content is unaffected and, with the exception of that in such easily perishable fruits as strawberries and blackberries, the vitamin content does not increase appreciably as the fruit ripens. The amount of vitamin C in strawberries and blackberries does increase sharply as the fruit changes colour, but it is of little practical importance, as these fruits are not picked until they have ripened. The superior flavour of ripe fruits is largely the result of the increase in its sugar content and improvement in its texture. The total energy value also is little affected during ripening.

The vitamin content of most vegetables, like that of most fruits, does not alter greatly during growth. The outside leaves of some vegetables become progressively greener and increase in vitamin A value somewhat, but the effect of climate usually masks any minor variations in the nutritive value of vegetables caused by their degree of maturity. Root vegetables vary little in their nutrient content during the harvesting period. Peas and beans, on the other hand, change considerably in nutrient content during ripening, as the concentration of vitamin C and sugar decreases markedly with advancing maturity.

Effects of Storage

Chiefly because they can usually be picked and used immediately, home-grown green vegetables and soft fruits are likely to have a higher nutritive value than bought produce, for they retain more of each vitamin, especially vitamin C. That effect is, of course, less in such fruits and vegetables as apples and potatoes, which are usually stored for considerable periods. As fruits and vegetables are the only important sources of vitamin C, it is particularly important that they retain as much of it as possible. As the other vitamins are less easily destroyed, the amount of vitamin C retained is usually regarded as a fair index of the total nutritive value.

Green vegetables are the most perishable foods in this group and are also the most likely to lose their vitamin C. This loss is enhanced by storage at high temperature or in sunlight and by conditions which tend to cause withering. For example, in one day spinach loses 3 to 4 per cent. of its vitamin C at 34 to 37 degrees F. and 44 to 51 per cent. at 70 to 73 degrees F.; turnip tops lose about 5 per cent. of their vitamin C in one day at 40 degrees F., compared with 30 per cent. at room temperature; and cauliflower, which retains its vitamin C well at 37 degrees F., loses up to 37 per cent. in 4 days at room temperature. That shows the importance of using such vegetables as fresh as possible in summer. Withering even at low temperatures such as may occur in vegetables kept uncovered in a refrigerator also causes considerable destruction of vitamin C, so they should be stored covered or, if possible, in a cool, damp place. Reviving withered vegetables by soaking them or wrapping them in a damp cloth does not restore the lost vitamin C.

In general, fruits retain their vitamin C better than vegetables during storage. For example, oranges and other citrus fruits have been stored for a month at 68 degrees F. without losing any vitamin C, but long storage causes some destruction. Tomatoes and apples also retain their vitamin C fairly well for short periods, though apples may lose a third of their vitamin C in 6 months' cold storage.

Soft fruits, however, may be expected to lose 10 per cent. of their vitamin C for every day's storage at room temperature. Cut fruits lose this vitamin more rapidly than whole ones, though for practical purposes this extra loss may be ignored if the cut fruit is not kept for more than a day; keeping orange, grapefruit, or tomato juice overnight for babies or children is quite safe. If fruits must be stored, a cool, dry room provides the best conditions.

Root vegetables also retain their vitamin C better than green vegetables, but ultimately they may lose considerable amounts, as often they are stored for many months. Old potatoes (after 5 to 6 months' storage) often contain less than a third of their original vitamin C and parsnips lose a similar amount.

Dairy Produce, Meat, and Eggs

The nutritive value of dairy produce, meat, and eggs may also vary considerably, perhaps the best-known examples being in the fat content of milk and meat. Fat meat may have 2 or 3 times the energy value of lean meat, though this may be offset somewhat by a slightly lower protein content. However, the higher percentage of fat in the milk of certain breeds of dairy cattle represents a clear gain in nutritive value, for such milk also has a higher vitamin A value than milk from other breeds on the same feed and contains up to 1½ times as much vitamin B_2 (riboflavin), of which milk is one of the most important sources.

Feeding may also influence the nutrient content of milk, eggs, and meat, perhaps the most important factor being the amount of grass or green fodder available. Because of climatic conditions and because New Zealand cattle probably are never completely stall fed, the vitamin A content of their milk is generally high, but in Europe and America, where dairy cattle are stall fed for many months, the vitamin A in the milk may drop to very low levels.

Hens are often not well supplied with green food, its lack soon resulting in eggs with pale yolks having a much lower vitamin A content than the yolks of eggs produced by hens normally given free range on grass or well supplied with greens.

Mineral deficiencies in the soil are also reflected, though to a less extent, in the mineral content of milk, eggs, and meat; for example, cattle on iodine-deficient soils produce iodine-deficient milk unless iodised salt licks are provided. The vitamin B_1 (thiamine) in pork—one of the best food sources of this vitamin—is considerably affected by feeding practices, poor feeding causing slower growth and lowering the vitamin B_1 value of the meat.

As milk, eggs, and meat are not considered to be sources of vitamin C, the effects of storage on their nutritive value are less than those on the value of fruits and vegetables. In addition, because of the necessity for absolute cleanliness in handling milk and meat, they are usually stored under conditions favouring the maximum retention of vitamins.

However, carelessness may cause a considerable loss of riboflavin from milk, as this vitamin is easily destroyed by sunlight if milk is left in the open in glass bottles—a fairly frequent occurrence in towns.

Avoiding Destruction of Vitamins

By using fruits and vegetables as fresh as possible and by storing all but green vegetables which require a reasonable amount of moisture (but which should not be left soaking in water) under cool, dry conditions the housewife can ensure that vitamins are not destroyed needlessly—in fact, that is the great advantage of using home-grown foods.

Other effects, though of interest to the nutritionist, usually are beyond individual control, assuming that adequate fertiliser is applied and sufficient cultivation undertaken to ensure good growth of plants, and provided that they are grown outdoors where possible. Hothouse fruits and vegetables in general contain less vitamin C than similar foods grown in the open air.

In addition, the housewife may be assured that a diet containing the amounts of protective foods—those high in nutrient content, such as milk and other dairy products, vegetables, fruits, and whole-grain cereals—recommended by authorities on nutrition and mentioned in previous articles in the "Journal" has been planned to provide a safe margin in excess of the individual's requirements of each nutrient.

The production of foods of high nutritive value will be of greatest benefit to the people living on sub-standard diets in many other countries and to a less extent in New Zealand. On the other hand, only very careless treatment or the use of poor methods of cooking and preserving foods will materially affect the well-balanced diet and cause it to contain insufficient of the nutrients required for health. Methods of cooking and preserving foods which ensure the maximum retention of nutrients will be discussed in a later article.

THE MUSEUMS OF NEW ZEALAND

CONTINUING the series of articles which was begun in the October issue of the "Journal" and which has described museums in various centres of New Zealand, Enid B. V. Phillips deals this month with the founding and development of the

Alexander Museum, Wanganui

RECORDS do not mention what manner of woman the wife of Samuel H. Drew was, but she must surely have been more long suffering than most, judging by the fact that from the time the Drews first settled in Wanganui in 1870 her husband commenced his favourite occupation of collecting. Mollusca and Maori artifacts and birds, beetles, and other native fauna were among the wide range of specimens, and Drew made the most of the material offering.

His was not the hobby of a solitary enthusiast; rather it became an increasingly absorbing pastime in which the whole family took part, helping him to collect and classify so well that his collection attracted widespread notice and people began coming from all parts of the district to view the private museum in their midst. Thus, Mrs. Drew had to cope not only with the constant encroaching of specimens upon the household's limited living space but with an ever-growing influx of visitors as well until by 1890 the problem became so acute that the suggestion to sell the collection on condition that it became the nucleus of a public museum for the town seemed the ideal solution.

Purchase Price Reduced

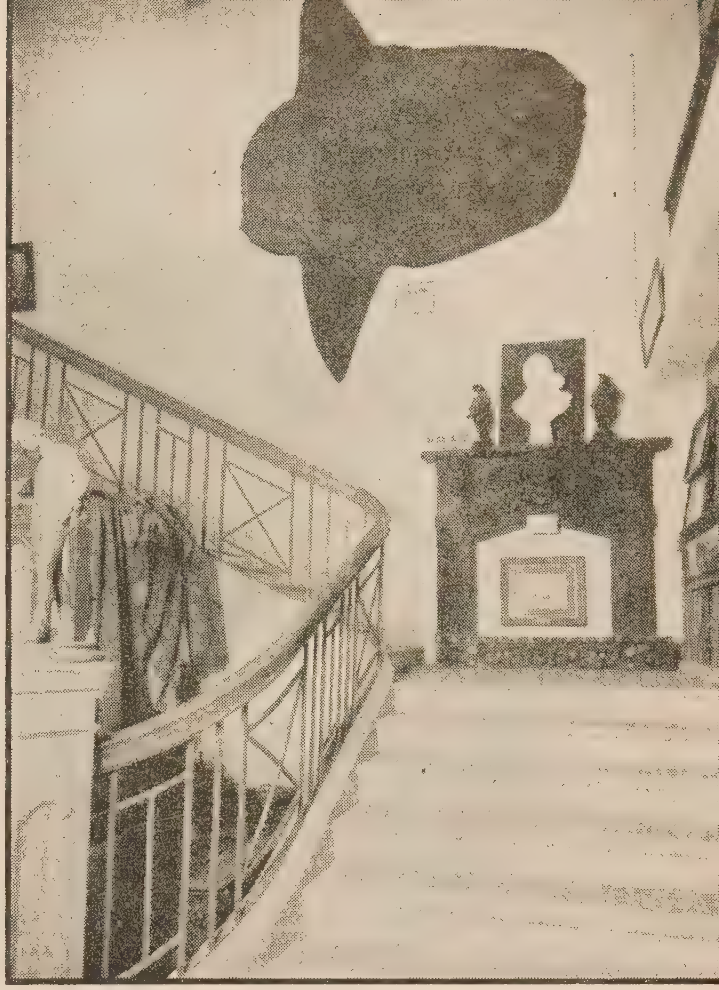
Drew generously reduced the purchase price to practically half the amount the director of the Geological Survey, Sir James Hector, estimated the collection was worth. The scheme was given further impetus when the architect offered to waive the usual fees for drawing the plans and specifications of the proposed building and the gaol authorities put prisoners to work preparing the site which had been selected on the south side of Queen's Park, or, as it used to be called, the more poetical-sounding Pukenamu (Sandfly Hill) of the Maoris.

It must have been a great relief to Mrs. Drew when the building was finished and her husband, who had consented to act as honorary curator, started to transfer his treasures from the crowded quarters of their home to the spacious showcases in the museum, a proceeding, by the way, which, in conjunction with the congenial task of rearranging the specimens, took nearly 6 months to complete.

The museum was officially opened on March 24, 1895, the visiting hours being limited to two afternoons per week and a charge of 1s. being made for admission until finances were sufficient to permit the employment of a full-time custodian. This was made possible by various money-raising efforts and public subscriptions, and on December 23 of that year the museum trustees presented Wanganui townsfolk with a Christmas treat in the form of free admission to the museum every weekday.

All went well with the museum while Drew was alive, but after he died in 1901 members, lacking the spur of his keenness and specialised knowledge, appeared to lose interest and the trustees slackened their efforts. If it had not been for the liberal bequests and donations of several local residents (among them Henry Sarjeant, whose name has been perpetuated by the art gallery built near the museum in 1917 as a result of a later legacy), the museum would probably have gone into recess. Happily, however, it was not necessary to resort to such a step and the museum continued to extend its collection whenever funds and exhibits were forthcoming.

One benefactor left a substantial sum of money which was more than sufficient to purchase the important Suter collection of mollusca, another bequeathed a house and property, and the revenue from the estate of a third enabled a new building to be erected on the flat section of parkland fronting the town. This dignified, double-storeyed, concrete structure, embodying the latest ideas in museum design and lighting, was opened in 1928 and is known as the Alexander Museum in honour of its donor, Miss E. Alexander.



[*Tesla Studios photo.*

The stairs leading to the natural history gallery of the Alexander Museum. Across the white wall sprawls the bloated, black shape of a monstrous sunfish, one of the many spectacular sea creatures in the zoological section.

Beauty and the Beast

A handsome marble bust of Drew adorns a graceful wooden pedestal at the turn of the stairs leading to the natural history gallery, and across the vast whiteness of the wall close by sprawls the bloated, black shape of a monstrous sunfish—a museum version of beauty and the beast. The gallery itself is given over to zoological exhibits. Gigantic swordfish, striped marlin, hammerhead sharks, and other denizens of the deep sea disport themselves in a lifelike manner, and there is an entirely new species of whale (*Tasmacetus shepherdi*), which was discovered by the late George Shepherd, noted taxidermist and curator of the museum for 18 years. Though no match for these fish in size, some of the smaller sea creatures are so fantastic in form that they are just as spectacular in their own way—for example, the sea-horses and the sinuous snake eels of unbelievable length, the porcupine fish, as prickly as its landlubber counterpart, the bulky elephant fish, and those members of the New Zealand crustaceae, particularly the gigantic crabs and the 8-legged variety of freshwater crayfish with long, slender feelers and large pincers which really put them into the lobster class.

A crocodile glares from its lair near a tuatara of considerable antiquity which has for neighbours its Australian relatives the bearded lizard and the frilled lizard and sundry small snakes. The skeleton of a lizard is included in the showcase of skeletons ranging from that of a whale to a white-throated shag; the moa skeletons, of which there are 8 separate species, occupy a sizable space of their own.

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Some were recovered from excavations penetrating to a depth of 5ft. in the rich, peaty soil of the Riverlands estate 3 miles from Wanganui, but most of the bones came from a great mudhole on the Todd farm, some 10 miles from the city. The moa specimen with the impressive appellation *Moa dinornis giganteus* is considered the best specimen of this species of the few ever found in the North Island.

In another showcase is a selection of skulls, including those of the lion, the sea-bear, the peccary, and the monkey together with the monkey's traditional enemy, the puma; homo sapiens is represented by the skulls of a Moriori and a Malukula Islander. Decidedly, the natural history gallery is no place for the nervous.

Mementoes of Tarawera Eruption

Reminiscent of tragedy are the two small tins filled with scoria and volcanic ash scooped up during the terrible eruption of Mount Tarawera on June 10, 1886, which wiped out a whole village and destroyed the wonderful Pink and White Terraces on the shores of Lake Rotomahana. A delicate-branching piece of pink stalactite and a fragment of white which had been picked up from these terraces some years before the disaster are now cherished souvenirs of what was one of the world's most beautiful sights.

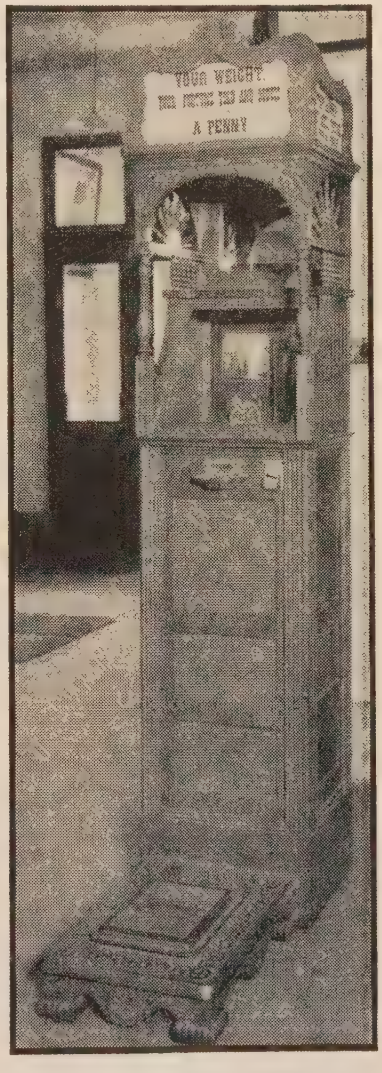
The effect of the eruption was not felt only on land, for the s.s. Southern Cross, which was at sea at the time, had her decks liberally showered with volcanic mud to a depth of 5in., a lump of greyish mud on display being evidence of this phenomenon. Several deposits of silica containing the forms of leaves and a lattice-like formation of lime found in a hot spring at Rotorua are much more pleasing mementoes of the thermal regions.

The quaint coal ornaments are not Nature's handiwork, but have been created by man, the lady's boot and the heart adorned with a kiwi probably resulting from some old-time miner's romantic attempt to fashion an original valentine for his sweetheart. Another unusual item of decoration is a little oblong plaque about 1½in. in length and carved in a fine-lace patterning of flying birds and trees in leaf. This, together with a highly polished pebble dish from Turkey, was among the precious stones presented to the museum by James Bull, a former carpenter who owned a store and a hotel in the locality now called Bulls and constituted himself as a carrier with Wanganui as his furthest place of call.

Agates, amethysts, and carnelians, amber, onyx, and jade, and pink, claret, cloud-grey, and golden cameos are not more beautiful in colouring than the birds arrayed along two sides of the gallery. Not only is there an almost complete collection of native avifauna, including the rare stitchbird, whose call sounds "like two flints struck together," and some of the lesser-known sea birds, but many of the "living jewels" of other countries —the lyre bird and the freckled duck from Australia; the tiny tropical humming birds, their glistening tufts and wings and forked or fanshaped tails gleaming with all the changing tints of opalescence; the South American macaw, both the blue and yellow variety and the red (the latter specimen, its scarlet tail a brilliant contrast to its green and gold body, being the first one bred in captivity in Wanganui); and a trio of quezals, or resplendent trogons, from the mountain forests of Guatemala. With their shimmering emerald and black plumage and long, sweeping tail feathers showing an under-flash of ruby they are considered by many people to outshine even the peacock and the bird of paradise in splendour.

Ingenious Music Machine

Every now and then the tinkling echo of the once-popular melody "The Side-walks of New York" drifts through the gallery as yet another newcomer puts a copper coin in the old-fashioned music machine in the main exhibition hall downstairs. This ingenious invention, which had its hey-day in America during the latter half of last century, plays a tune and predicts fortunes in Maori and English alternately, all for the sum of one penny. It originally estimated a person's weight as well, but though the weighing device has not functioned for some time now, this defect has in no wise diminished the machine's popularity among museum visitors.



[*Tesla Studios photo.*

The old-fashioned music machine which stands in the main exhibition hall of the Alexander Museum. For a penny the machine still plays a tune and predicts fortunes in Maori and English alternately.

Music of quite a different type is made by another exhibit, a 5ft.-long pukea, a Maori war-trumpet; its sound carries clearly for fully 2 miles, and when the Natives first heard the pakehas' guns firing they mistook the sound for that of these instruments. The first organ sent out to New Zealand for the use of the missionaries is in the museum, too. It was installed in the mission church at Paihia, Bay of Islands, during the early ministry of the brothers Henry and William Williams. Henry Williams was the first European clergyman to visit Wanganui, where he preached to a congregation of several hundred Natives on the beach at Putikiwharanui, 2 miles up the river on the opposite bank to the township.

The wall bracket supporting a bronze bell salvaged from some coastal vessel is also of interest, being made of timber from the ship Boyd, which was burnt at Whangaroa, Bay of Islands, in 1809, after the massacre of her passengers and crew. This event hindered the establishment of the Rev. S. Marsden's mission in New Zealand, as the Governor of New South Wales did not permit the advance party of missionaries to proceed to the Land of the Long White Cloud for another 7 years.

The Wanganui Maoris' deep-felt desire for a missionary to be stationed in the district was fulfilled comparatively soon after Mr. Williams's visit, when the Church Missionary Society sent the Rev. John Mason to this populous area. Mr. Mason took the large district on the south side of the river as his particular charge (in which he was aided by his wife, who conducted a school for the female Maori population six afternoons a week), and the lay catechist Mr. Richard Matthews laboured on the northern side, his territory extending as far as the Waitotara River basin. The Maoris at once set about building raupo huts for them until more substantial homes could be erected, and the inhabitants of some of the more distant pas travelled for several days to greet the newcomers.

The newly won converts to Christianity were quite prepared to fight in defence of their faith when attacked by heathen war parties on several occasions, and it was only Mr. Mason's personal courage in braving the formidable Ngati-Tuwharetoa leader Te Heu Heu in his encampment and tending his sick daughter which turned that warlike chief's enmity to gratitude and prevented another battle.

After 3 years of zealous service Mr. Mason met his death by drowning when attempting to cross the flooded

[*Tesla Studios photo.*

Wanganui's first public museum, which was opened on March 24, 1895. The building is now used for meetings and lectures, the collections having been transferred in 1928 to the new museum.

Turakina River on horseback, and his burial at Putiki was attended by many mourners both Maori and pakeha.

Gifted Successor

His successor was the Rev. Richard Taylor, a gifted Cambridge graduate who, soon after he was ordained, served in the Isle of Ely and later came out with his wife and family to Australia, where Marsden appointed him chaplain of Liverpool (then largely a convict settlement) for a term, and thence to New Zealand. In their first 4 years in this country the Taylors experienced for themselves the truth of the Biblical teaching: "The Lord gave and the Lord hath taken away," for the birth of their baby daughter was offset by the death of their first born, a boy of 10, who was killed by a fall from his horse.

No matter how engrossed he was in his evangelical activities Mr. Taylor always had a fatherly concern for his family's welfare, his first act after moving into the mission house at Putiki-wharanui being to find a builder to erect a more suitable and commodious dwelling. Their new home, a solidly timbered, two-storeyed mansion, had 11 rooms, a number not excessive considering the hospitable habits of the Taylors and the fact that they had 5 children. Moreover, the entire cost of the new mission house was a mere £110 and it took only 6 months to complete. Small wonder harassed house hunters sigh somewhat wistfully when they see the rough plan and specifications of this desirable residence (dated May 30, 1843) displayed in the museum today.

Though Mr. Taylor's duties took him away from home for long periods, especially when stormy weather rendered foot travel through dense forest fastnesses and swift-flooding streams slower and more dangerous than usual, he always made it a practice to spend the season of good will with his own family, taking an important part in the traditional festivities so beloved and eagerly awaited by children and holding special Christmas services for his Putiki parishioners, who came in such crowds that the mission church was not big enough to accommodate them.

How this far-from-robust man managed to undertake such arduous journeys to expound the Gospel, officiate at marriages, baptisms, and burials, mediate between the settlers and the Maoris in disputes over land claims, start the first school for the children of European settlers in Wanganui, establish a small hospital near his home for the care of sick Maoris, take an interest in the geology of the country and the customs and mythology of the Maoris, keep a meticulous record of his activities, and, withal, find time to write two books, which were published in England, denotes not only outstanding character and ability, but also an unwavering faith in the Giver of all strength.

His first volume, "Te Ika a Maui: New Zealand and its Inhabitants" (published in 1855), is illustrated by many of his own sketches, and his definite talent in this direction gave him a great interest in common with John Alexander Gilfillan, a naval man who became a drawing master at a Scottish college and an illustrator and portrait painter of note.

Painting Combined with Farming

Being of a practical nature as well as artistic, Gilfillan took a course in carpentry and engineering to equip himself for colonial life before leaving his homeland for New Zealand in 1841. He eventually took up land at Matarawa and was fortunate enough to combine painting with farming, the Wanganui settlement and surrounding countryside providing him with subjects in plenty for his brush. Indeed, his colourful picture of the interior of the Putiki pa is usually acclaimed his masterpiece.

Mr. Taylor was the officiating minister at the marriage of John Gilfillan's 15-year-old daughter to a fellow-settler, Dr. Allison, on a rainy April day in 1844, this being one of the first marriages recorded in Wanganui. Though the festivities were held in a house with mud walls and furniture improvised from packing cases, the female guests were as fashionably attired as at any society function in the Old Country. Furthermore, the wedding breakfast was notable for the "considerable display of plate."

The future indeed looked fair for the young couple, but alas! 3 years later their little child, who was spending the Sabbath with Mrs. Allison's parents, died from the dreadful injuries received when a band of lawless Maori youths, angered by an accidental injury to one of their race by a midshipman from a gunboat, attacked the unprotected household in remote Matarawa by way of revenge, killing Mrs. Gilfillan and several of the children. A 7½-year-old boy and his sister a year or so younger managed to escape through a back window and hid in a gully all night. Though badly wounded in the back of the neck by a blow from a tomahawk, John Gilfillan walked 6 miles along a twisting, overgrown track to get help, but in the meantime his home was ransacked and burnt.

Friendly Putiki Maoris by a clever stratagem captured the murderers, who were promptly tried by court-martial, and all save the youngest paid the death penalty for their crime, and the remaining members of the Gilfillan family were put in the kindly care of Mrs. Taylor at Putiki.

Much-prized Exhibit

The Gilfillans left for Australia shortly before the year's end, John Gilfillan finding some measure of solace in his art. A number of his paintings are featured in Australian and New Zealand galleries. His paint box is a much-prized exhibit in the Alexander Museum and is placed in close proximity to a silver teaspoon and a sixpenny-piece which were picked up from the scene of the massacre—pathetic relics of that happy home set in the heart of the lovely Matarawa Valley more than 100 years ago.

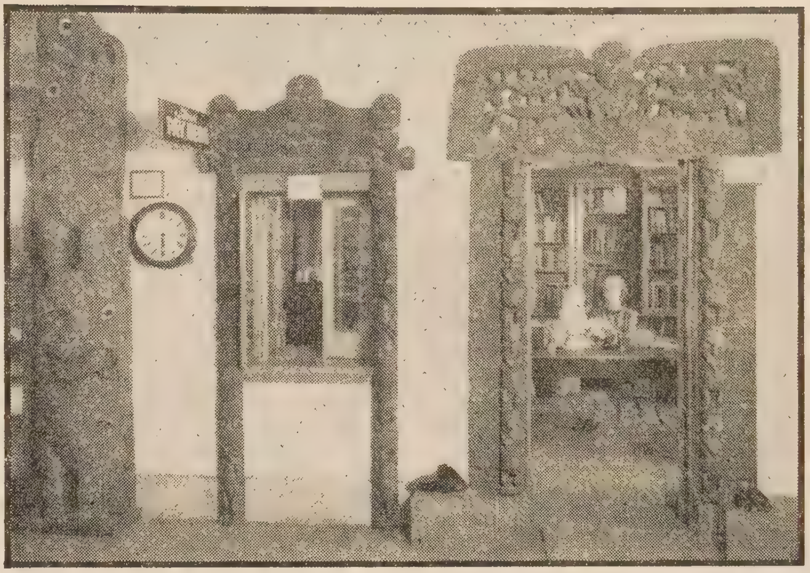
The Gilfillan trouble was one of the incidents, plus various disputes over the ownership of land, which formed the prelude to major hostilities with the Maoris. The stockade and blockhouse which had been built on the top of Pukenamu, the hill opposite the present museum, from timber obtained by the Putiki Maoris, was garrisoned by men of the 65th Regiment, and was called the Rutland Stockade as the result of the regiment's connection with the Duke of Rutland. A bedstead from the stockade has been preserved in the museum bay which depicts a brief pictorial history of Wanganui from 1840 to 1890, but the blockhouse, which did duty as a prison after the Maori Wars, was removed in the late 1880's, when a short-sighted borough council, emulating Esau of old, parted with the town's most historic inheritance for a paltry £22 10s. and permitted it to be pulled down.

In the former market place at the foot of the stockade hill, where the Wanganui chiefs and their tribes assembled to receive the goods offered by Edward Jerningham Wakefield on behalf of the New Zealand Company in exchange for their lands, stands a monument to the lower river Maoris who fought at Moutoa on May 14, 1864, and prevented the Hauhaus from invading the settlement; proudly displayed in the museum is the beautiful flag made by the white women of Wanganui and presented to the warriors in appreciation of their bravery.

Most Chivalrous Battle

The battle of Moutoa was surely one of the most chivalrous in history. It was conducted throughout according to pre-arranged rules, the combatants even meeting each other beforehand to determine the site of the conflict—the scrub- and shingle-covered stretches of the solitary "Isle of Heroes," beset on all sides by rapids and some 50 miles up the river. Furthermore, the attacking war party was given permission to come ashore from their canoes and perform a preliminary war dance before taking up their battle positions and opening fire. These advantages, allied with their fanatical belief that neither bullets nor blades of steel could injure them and that the long and frenzied chants of their partisans, particularly the women and small children, watching the proceedings from the Tawhitinui side of the river, also held magical powers of protection, gave the Hauhaus a fine start, so that for a time victory seemed to favour them. However, the heroism of Tamehana-te-aewa in holding the Wanganui men together after three of their leaders had fallen and resisting the Hauhau onslaught himself by shooting two of these reputedly invincible fighters and spearing a third not only destroyed the legend of the Hauhau invulnerability, but gave time for the rearguard of the defending forces, stationed lower down the island, to come to the rescue and drive the invaders back into the river.

The lower river tribes took no further action against the vanquished Hauhaus after the finish of the battle and considerately allowed the survivors, together with their kinsfolk, to retreat overland from Tawhitinui and take refuge in a pa on the Waitotara River.



[*Tesla Studios photo.*

The dark-brown pare or korupe framing the window of the museum office is a modern totara carving from Tawhitinui, Wanganui River, and the carvings on the decorative, red timbers of the doorway, the upper portion in manaia pattern, are the work of an East Cape carver.

The good wives of Wanganui were so grateful to the local Maoris for saving the settlement from the much-feared Hauhaus that they decided to present them with a flag and set up a fund for this purpose and also for the widows and orphans (an undertaking in which they were joined by their fair sisters in Rangitikei and Manawatu). Donations came in freely and early in March, 1865, a special ceremony was held in the market place, practically the entire population attending, and the colours were presented to the leading chiefs and their men by the lady who had laboured longest in making the flag. Her brief but eloquent address prefacing this important presentation proved her to be as gifted a speaker as she was a sewer.

To see this huge flag of heavy, cream silk outspread in a museum showcase, the Union Jack worked in one corner and a crown in the centre, artistically contrived from gilt thread and crimson velvet, and with the hand of a pakeha clasping that of a Maori and the gracefully lettered word "Moutoa" set off by appliqué sprays of green silk laurel leaves, awakens a ready admiration for the skill of Wanganui's leading needlewoman who spent every leisure moment for 5 months patiently stitching at this unique emblem of gratitude.

Te Kooti's War Flag

Another noted war flag is that used by Te Kooti. Though tattered now and with its scarlet stripes a trifle faded against their dun background, it is so treasured that it is stored for safe keeping in a special compartment amid the shelves of valuable books and documents in the museum office. The authorities are evidently taking no chances of this precious banner being cut up for polishing cloths, the ignominious fate that befell Te Wepu, "the whip," the symbolically embroidered, crimson silk pennant, 52ft. long, which was captured from one of Te Kooti's lieutenants in the Rotorua campaign in 1870 and later presented to the Dominion Museum, Wellington. Why such a handsome and interesting trophy was converted into dusters for the use of the museum's charwoman is still a mystery.

[*Tesla Studios photo.*

The war-canoe Te Mata-o-Hoturoa, in which the Wanganui warriors raided Te Rauparaha in his Kapiti stronghold. This celebrated canoe was also used in many of the river battles, and the bullets embedded in the bottom are souvenirs of the fighting at Puketapu and Ohoutahi in 1865.

THE MUSEUMS OF NEW ZEALAND . . .

One of the most famous members of the Queen's forces to engage in the pursuit of Te Kooti was Te Rangihiwinui, better known as Major Kemp, and his portrait, hanging in the main hall of the museum, shows him wearing the ceremonial silver sword with its elaborately engraved hilt and crimson leather belt and scabbard presented to him by Queen Victoria for his unfailing loyalty and valour and which, together with his rifle, may be seen among the other mementoes of the Maori Wars. This picture, like most of the other oils in the museum, was the work of Gottfried Lindauer, an artist from Bohemia, Czechoslovakia, who took a cottage in an isolated part of the Wanganui district in the 70's and painted the characteristic Native types which appealed to him, a custom he followed in other parts of the country with conspicuous success both from an artist's viewpoint and that of the student seeking to learn more of Maori life.

Small boys visiting the museum seldom fail to get a thrill out of seeing the bullets embedded in the bottom of the big waka taua Te Mata-o-Hoturoa. This mighty war canoe, hewn from a giant totara and believed to be 180 years old, is the one in which the Wanganui warriors made their attack on Te Rauparaha in his Kapiti stronghold and was used in a number of the river battles, including Puketapu and Ohoutahi.

A carved bone mere more than 400 years old is of particular interest, as it was presented to Sir Donald McLean, who, as interpreter and assistant to the Native Protector in 1848, drew up the deed of sale for the 82,000 acres comprising the Wanganui block and carried out the transaction with due regard to the claims and customs of the Native owners, thereby settling the land problem satisfactorily and ensuring the future prosperity and development of the new settlement.

Finest Maori Craftsmanship

Another ancient weapon on display is a toki-poutangata from Gisborne; its greenstone blade and ornate carving represent Maori craftsmanship at its finest, as does a tiny, circular pot for holding tattooing pigments, which is carved in a complex manaia design and decorated with paua shell "eyes."

Relics of wars in other lands include a pair of paste buckles worn by Sir Edward Mawby at the Duchess of Richmond's ball on the eve of Waterloo, and vivid, little, vermilion shoes, pale-blue satin trousers embroidered with flowers, a peach-blossom-pink tunic and a beaded scarlet one, and other colourful Chinese baby clothes looted from Canton at the close of the Opium War in 1841. Items relating to the First World War occupy a whole bay.

In addition to an extensive collection of Maori artifacts (including the Newman collection, presented by Dr. and Mrs. A. H. E. Wall in memory of their son) and a number of prehistoric rock pictures, the museum possesses a series of displays cleverly planned by the late George Shepherd to demonstrate the ancient Maori methods of tree felling and handling and hoisting heavy timber and the traditional techniques employed in eel and lamprey fishing and in catching rats and snaring birds. The great maihi, the barge boards of a wharepuni (a sleeping house), erected gable fashion against the end wall of the museum and which are a rose-red glow in the gloom of late afternoon, and the carved pile of a pataka, a storehouse, are choice examples of age-old Native arts; so, too, is the wooden effigy of Rangi-waha-kore, ancestor of the Pamoana sub-tribe, the head and shoulders of which are polished shining smooth through generations of river people pausing to put a friendly arm about this genial guardian of the pa as they passed by.

Early and Modern Carving

It is interesting to compare these early carvings with the work of present-day craftsmen—for example, the pare (or korupe), the modern totara carving from Tawhitinui Valley, which forms a frame as dark brown as a tree fern trunk for the wide window of the museum office, and the decorative, red timbers of the doorway, the upper portion being executed in manaia pattern by an East Cape carver. The waka huia, box for holding huia feathers belonging to a person of high rank, with its intricate spirals so typical of Polynesian design, provides a pleasing foil for the classic simplicity of the piece of European sculpture, the head of a child in marble, placed beside it on the office desk.

The spinning wheel in the corner of the office is no museum heirloom, however, but indicates the practical pastime of its owner, Mrs. Flora Spurdle, who is in charge of the museum. This competent cicerone, whose conversation is full of entertaining facts concerning the multitudinous exhibits in her care, is an authority on Maori lore, much of it learned from the Maoris themselves in the pas up the river. Moreover, her penchant for studying Maori place names, combined with a thorough knowledge of local history, has made her the ideal person to recount in literary as well as verbal form the story of this fascinating museum.

☆

A Cutlet Pan has Many Uses

THE type of cooking utensil illustrated is called by its manufacturers a cutlet pan, but it has many more uses than cooking cutlets. Its big advantage is the well-fitting, perforated lid, which prevents fat from the food spluttering over the surface of the stove or range and on the sides of other saucepans in use at the time. The perforations are sufficiently large and numerous to allow steam to escape, so the lid does not prevent the food from browning or becoming crisp. Therefore the pan is good for frying chops, steaks, and rissoles, and it is a boon for preparing bacon and fried tomatoes—a dish which usually splutters badly when the tomatoes are added to the bacon. Another good feature is the size of the base, which fits well over a large element of an electric stove and so uses all the heat.

As the cutlet pan is the same diameter as a large saucepan, the solid lid can also be used on the pan, which is then excellent for cooking stews. The meat and onions can be browned in the pan covered by the perforated lid, and when the liquid and other vegetables are added the solid lid is put on while the stew continues cooking.

Still another use is for deep-fat frying, especially for potato chips, as more chips can be cooked in less fat than is needed when a saucepan is used. Scrambled eggs cook more quickly in the cutlet pan (without the lid, of course), as more food is in direct contact with the heat.

A pan of this type is a valuable addition to the household collection of "top-of-the-stove" cooking utensils.

—*EVA TOPPING, Rural Sociologist,*
Department of Agriculture, Auckland.

[Sparrow Industrial Pictures Ltd. photo.

MAKING LEATHER GLOVES AT HOME

GLOVE making is not difficult. Any competent needlewoman can master the art easily, and with care even those who are not experienced can turn out gloves that no one would be ashamed to wear. Home-made gloves have two great advantages: Even counting the maker's time they are extraordinarily cheap, and, as they are cut out at home, they may be made to the wearer's measurements and so should fit better than factory-made gloves cut to standard patterns. The art is described and illustrated in this article by Eirene E. Unwin, Rural Sociologist, Department of Agriculture, Dunedin.

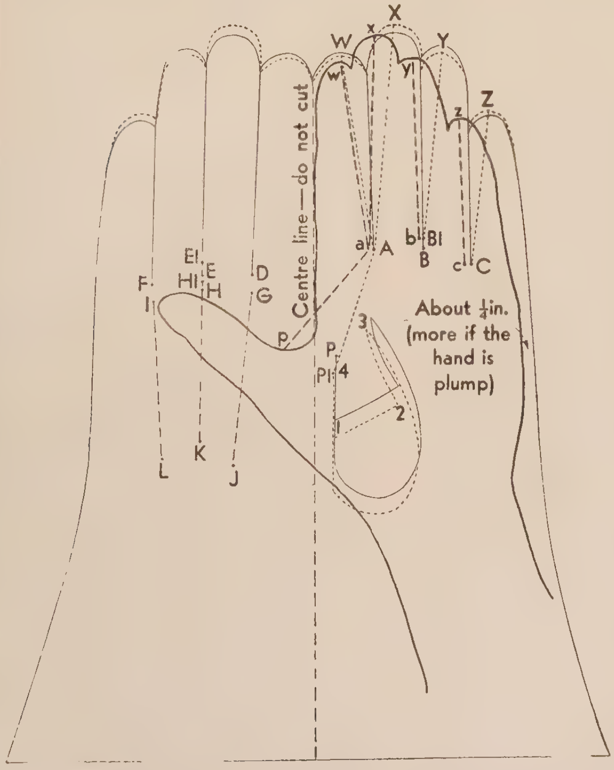
[Jack Welsh and Sons photo.

IF gloves are to fit, the pattern must be adjusted accurately according to whether the hand is long or short, thin or thick, narrow or broad. Standard patterns are made for average hands, and individual hands may vary from the average in three places—in finger lengths, in the positions of the bases of the finger divisions, and in the positions of the thumbs. They may also be thicker or thinner than average. Therefore the first step is to choose the size of standard pattern to fit best and to adjust it in these three places.

Altering a Pattern

Measure the hand by holding a tape round just above the knuckles at the roots of the fingers and below the finger divisions on the back of the hand and reading off the size of pattern required in inches. If the hand is fairly plump, choose a size ¼in. larger than the hand measurement. It may be easily adjusted for length later, but using the larger size helps to ensure that the glove is not tight.

Lay the selected pattern on a large sheet of note-paper and draw round it carefully as in the diagram on this page, or trace the pattern on to the note-paper. Mark in the hole where the thumb piece is fitted; the dot P for the tip of the cut making the thumb flap; the dots G, H, I, J, K, and L for the "nips" up the back of the hand; and the dots A, B, C, D, E, and F for the positions of the bases of the finger divisions. Mark in the position of the centre line of the pattern, dotting it and the lines of the nips, as these are not cutting lines. On the final pattern it is a good idea to mark the centre line clearly "Do not cut," as the gloves are spoilt if the leather is cut here. The cutting lines between the fingers may be ruled in as may the line up to P for the third edge of the thumb flap.

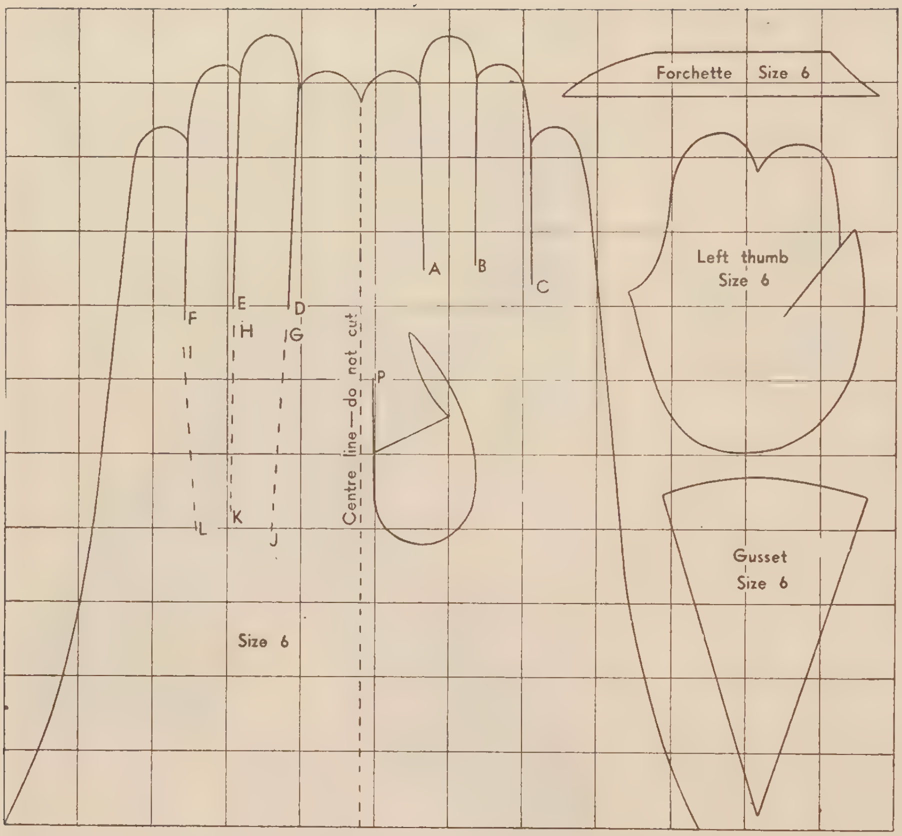


Altering the glove pattern to fit the hand.

Lay the hand, palm side down and fingers together, against the centre line and on the palm side of the pattern drawing so that the point A is on a line with the point *a*, the bottom of the space between the first and second fingers. Find this point by holding a sharp pencil vertically well down between the fingers. Be sure the inside line of the hand is straight with the centre fold line of the pattern, though the fingers will appear closer together than the pattern fingers and sloping in more. The pattern should be about ¼in. wider than the widest part of the hand. Hold the thumb out sideways as far as possible, flat on the paper.

Holding the pencil vertical, draw round the hand from the wrist, round the thumb and finger tips, and back to the wrist. Before lifting the hand separate the little finger and mark in the dot *c* at the base of the division between it and the third finger, then separate the first finger and mark in *a* to check its position, and finally mark in *b* at the base of the division between the middle and third fingers.

Bases of finger divisions: Alter B and C if necessary to be on a level with *b* and *c*, and alter E and F by the same amount. (In the diagram only B needed altering to B1 and E to E1.) The measuring must be done on the palm of the pattern, as on the normal hand the finger division is about ⅛in. shorter on the palm of the hand than on the back. The pattern allows for this difference and the correct relative positions of the bases of the back and palm finger cuts must be kept. If E or F is altered, the tops of the nips should be altered. too, to keep the spaces DG. EH, and FI approximately equal.

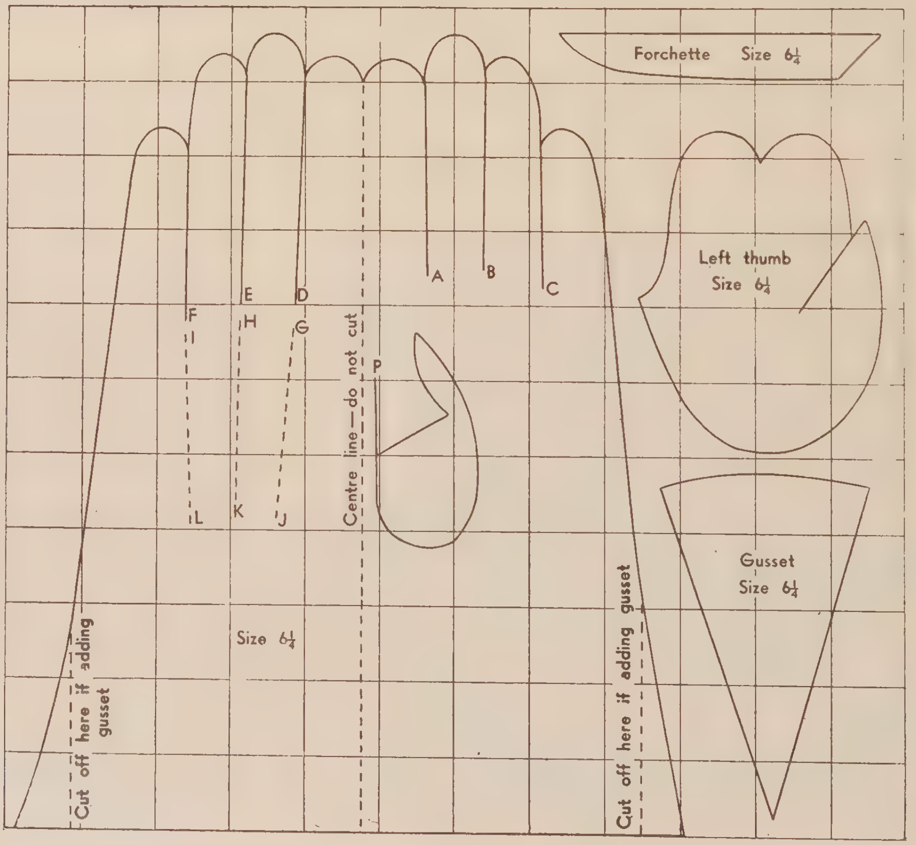


PATTERN FOR SIZE 6 GLOVE

Each square = 1in.

PATTERN FOR SIZE 6¼ GLOVE

Each square = 1in.



Finger lengths: From *a* rule the lines *aw* to the tip of the first finger of the hand drawing and *ax* to the tip of the middle finger, then rule *by* and *cz* to the tips of the third and little fingers respectively. The glove pattern must be cut 1/8in. longer than each finger of the hand to allow for thickness, so AW (the length of the first finger of the glove) must be 1/8in. longer than *aw* (the length of the first finger of the hand). Rule in AW, AX, BY (or B1Y), and CZ (or C1Z) in each case 1/8in. longer than *aw*, *ax*, *by*, and *cz*. Lay the glove pattern on the paper again, matching the centre line, but with the tip of the first finger on W, and redraw the front and back of this finger tip. Then slide the pattern up or down so that the tip of the middle finger lies on X and redraw the front and back of this finger tip. Similarly redraw the tips of the third and little fingers, drawing the front and back together in each case. In the diagram the corrected finger patterns are shown in dotted lines.

Thumb position: Draw the line *ap* to the lowest place in the curve of the thumb, and alter P to P1 if necessary, so that *ap* equals AP1. Place the pattern down again and redraw the thumb hole (dotted line in the diagram) so that P falls on P1 and the thumb hole is raised or lowered accordingly. It should not be shifted to right or left.

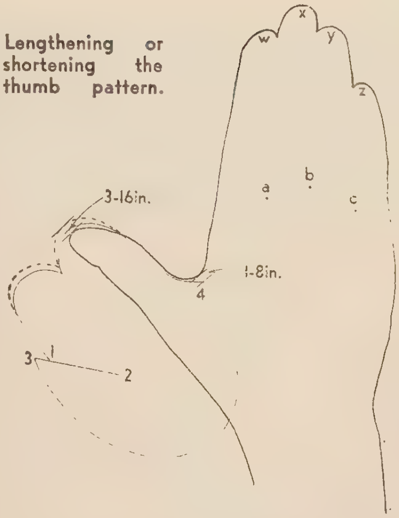
If the fingers are very slender but the hand normally broad, each finger piece may be trimmed a little, though no alteration is made to the pattern, but only to the leather when the glove is being made.

The pattern of the hand piece has now been altered in all the ways necessary to make it fit, and the corrected drawing may be traced off or stuck on to thin card and the pattern cut out. Small holes should be made at A, B1, and C1; D, E1, and F1; G, H1, and I1; J, K, and L; and P1. (On the diagram C1 and C, F1 and F, and I1 and I are identical but that is not always so.) The thumb hole should be cut right out. In each case the line should be just cut off, as the pattern will be drawn around and, if the line is left on it, the pattern tends to become a little too big.

Adjusting the thumb pattern: Draw another outline of the hand and on it lay the thumb pattern, as shown in the diagram above, so that there is 1/8in. between the point 4 on the pattern and the inner curve of the tracing of the hand. Draw round the thumb pattern. It should be 3/16in. longer than the thumb, and the tip must be redrawn if it is not the right length. Mark the correct position for the tip 3/16in. beyond the tip of the thumb outline, lay the pattern down on this mark, and draw round the front and back of the top of the thumb piece again as shown. If the thumb is exceptionally broad, make the pattern a little wider on each side. Mount it or trace it on to cardboard and cut out the corrected thumb pattern.

Forchettes: The pattern of the forchettes (the pieces that go between the fingers) is not adjusted. Each is cut to length as the gloves are being made up. However, should the forefinger be exceptionally plump—as big round as the base of the middle finger—one pair of forchettes may be cut a little wider and kept specially for the forefingers, but that is not usually necessary if care is taken to cut the forchettes from stretchy leather, as described later. The forchette pattern should also be mounted on thin card and cut out.

Lengthening or shortening the thumb pattern.



These three pieces—the hand, the thumb, and the forchettes—form the master pattern. From the leather are cut two hands (a right and a left), two thumbs (a right and a left), and six pairs of forchettes (six rights and six lefts). The pattern pieces are merely turned upside down to change them from right to left. When the patterns are being fitted on to the skin, extra pattern pieces are useful so that the complete layout may be seen at once and the best placings planned. These extra pattern pieces may be cut from paper for the layout, but when the pattern is being marked on to the leather the cardboard master pattern should always be used. Once a pattern has been adapted to fit an individual hand the name of its "owner" should be written on both hand and thumb pieces. It is also wise to keep copies of unadapted standard patterns for each size to adapt for different hands if necessary.

Selection of Leathers

Gloving leathers in a fair variety of types and colours usually are available from wholesale leather merchants or from tanneries. Some large drapers' shops sell chamois leather. Merchants usually will send a sample of their range on request. Prices vary, but are about a few shillings per square foot. Only whole skins are sold, and a skin of about 4 sq. ft. usually will make two pairs of gloves, unless it is very irregularly shaped, when it cuts to waste more. If matching skins are bought, three pairs of gloves frequently may be cut from two skins.

Skins should be sound and free from blemishes. Holding a skin up to the light may reveal very thin patches, and if such a skin has to be used, the thin places should be marked and avoided when the pattern is laid.

Patterns are sized for skins of medium stretchiness and, if a skin has more or less stretch than average, a smaller or larger pattern should be used. A glove made from very stretchy leather may "grow" to a whole size bigger than that of the pattern from which it was cut.

Before the pattern is laid the leather shoud be examined for stretch. Theoretically, the stretchiest way of the skin is round the animal, but that may be altered in the process of manufacture. However, one way will be found to stretch most when the leather is taken by opposite edges and pulled, and the direction at right angles to this usually stretches least. The direction of most stretch should be marked clearly at the edges of the skin. That is most important, as the pattern must always be placed so that the stretch goes around the hand.

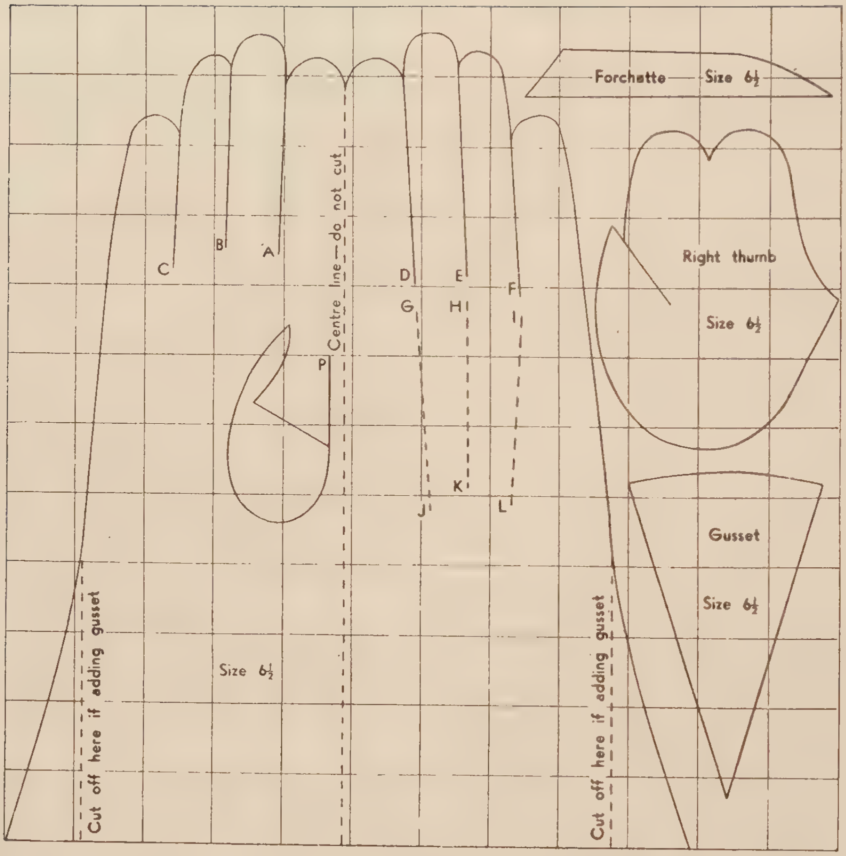
This is the one unbreakable rule of glove making and applies to all the pieces—hand, thumb, and forchette. Each must be placed so that the stretchiest way of the leather lies directly across it, and the least stretchy way lies up and down.

If it is possible to see the line of the backbone of the animal, the hand pieces should be placed with the palm side of the pattern on or near this area of the skin. The palms of gloves get most wear and the skin along the animal's back is usually the best part. A pair of gloves should be cut to match, so that each glove has the same sort of leather in the palms—the best leather.

Marking and Cutting

Before the pattern is laid on it, the leather should be stretched both ways—first across, then up and down, then across again—until it is soft and evenly stretched. The last stretch should be across the skin, which is then laid right side up on the kitchen table and either pinned out smoothly but not tightly or held firmly with paper weights. If the table is of plain wood and is wetted first, the leather can be smoothed down carefully and evenly on to the wet surface, which helps to hold it in place while the pattern is marked out. In any case the skin should be stretched first and then held down evenly and a **little** on the stretch until all the pieces have been marked. If the leather is lifted part way through the process the glove pieces tend to have different amounts of stretch and so do not fit properly.

When the leather has been laid out smoothly, the pattern pieces may be laid in position and the best layout planned according to the rules given rather than for greatest economy. Squeezing the pattern into corners to get an extra glove out is false economy, as the resulting gloves will be cut from poorer skin and will not wear so well. The thumbs should also be cut from good leather with reasonable stretch. For the forchettes the

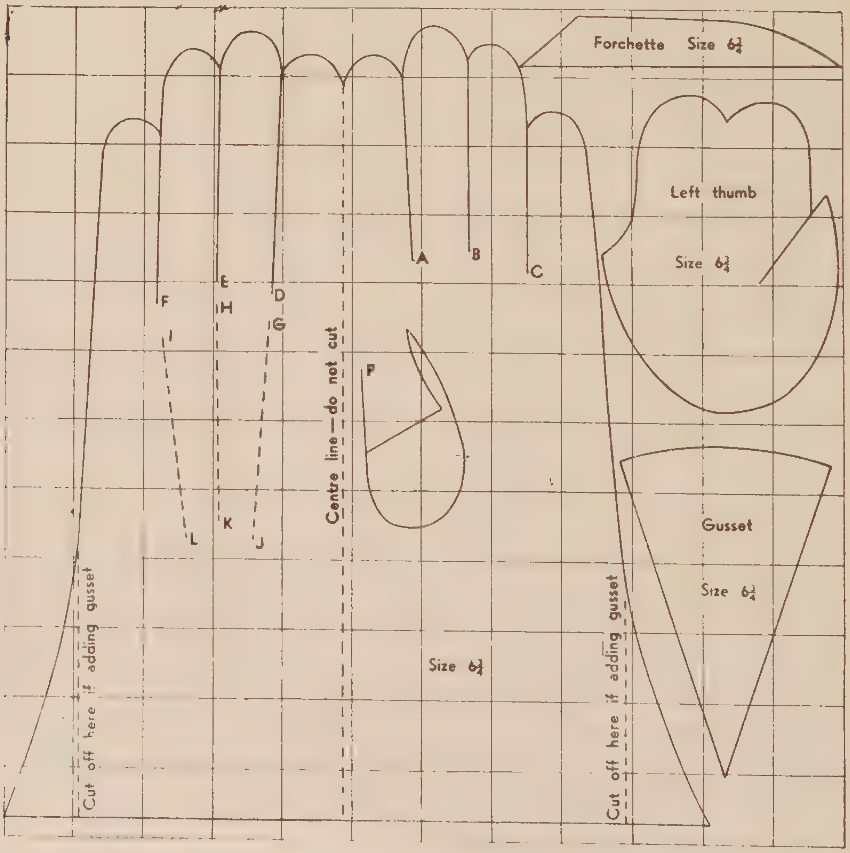


PATTERN FOR SIZE 6½ GLOVE

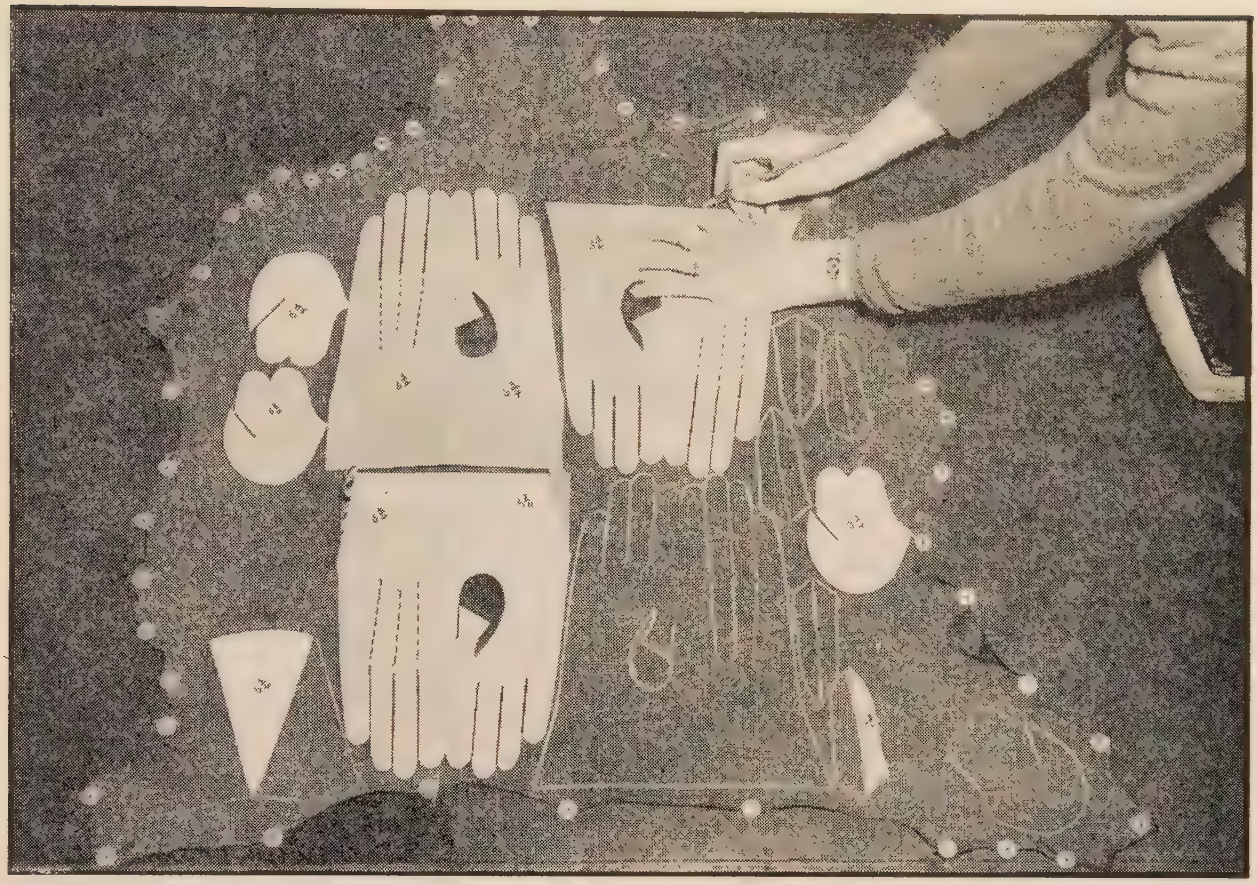
Each square = 1in.

PATTERN FOR SIZE 6¾ GLOVE

Each square = 1in.



MARKING AND CUTTING LEATHER FOR GLOVES



[*Jack Welsh and Sons photo.*

Two pairs of gloves can be obtained easily from this 5 sq. ft. skin, which has been stretched slightly and pinned down all round on the floor. The hand pieces are arranged so that each palm will be cut from the centre part of the skin. All the pieces are arranged so that the stretch of the leather is across the pattern; the thumb piece drawn at the lower right is placed correctly, for in this skin the direction of stretch was different in this part. The pair of gloves marked out on the right will have no gussets; one more pair of forchettes is to be marked. The patterns for the pair on the left are laid on only approximately and a cardboard master pattern will be used when the marking is done. The lower corners of each hand piece are folded up, as this pair is to have gussets in the side seams from the cuffs to half way up the sides. The gussets have been drawn at the lower left. There is plenty of space left on the skin for marking out the six pairs of forchettes needed for the second pair of gloves.

leather should have as little lengthways stretch as possible but a good crossways stretch, often found at the sides of the skin.

Each pattern piece must be turned over for the second half of each pair so that complete right and left hands are cut.

For marking each piece a sharp, hard pencil should be held on the slant; if it is held vertically, it will "drag" the leather. A continuous outline need not be drawn, as dots about ½in. apart are sufficient and avoid any drag. Be sure to mark the points for the bases of the finger divisions, for the nips, and for P (the thumb flap) when drawing the hands and point 2 when drawing the thumbs. As soon as the pattern is removed rule in the lines for the finger divisions, those for the nips, and the cutting lines for the thumb flaps to P and on the thumbs from 1 to 2. Marking the centre line of the pattern on the gloves is not necessary, and the centre line should never be cut.

Cut out all the pieces with sharp scissors. Care should be taken to make a smooth, neat edge, as improving it by trimming or snipping later is almost impossible, and the seams cannot be neat if the edges are not cut neatly. Cut out exactly on the line or dots, as no seam allowance is necessary, the narrow width taken up by the seams being made up for by the stretchiness of the leather.

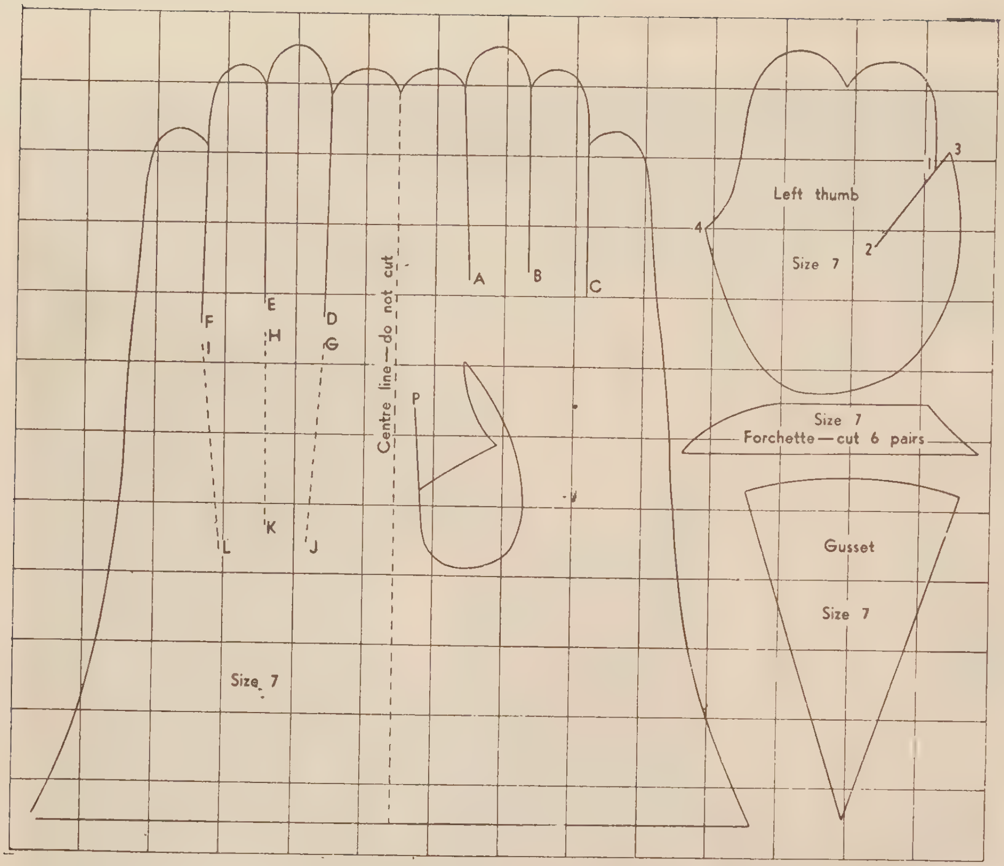
Cut the cuffs and up the sides of the hand pieces correctly, and then cut roughly beyond the finger tips; cut a little way down each finger division before rounding the tips of each finger, as this is the easiest way to get good edges round the finger tips. Do not cut right down the finger divisions at this stage; sewing is made simpler if these are not cut until the last minute, as this avoids having a great many little flaps of leather round which the thread tends to catch. Cut the thumb hole right out.

As each piece is cut out it may be laid smoothly in a box, each piece face to face with its pair, until it is needed.

Methods of Stitching

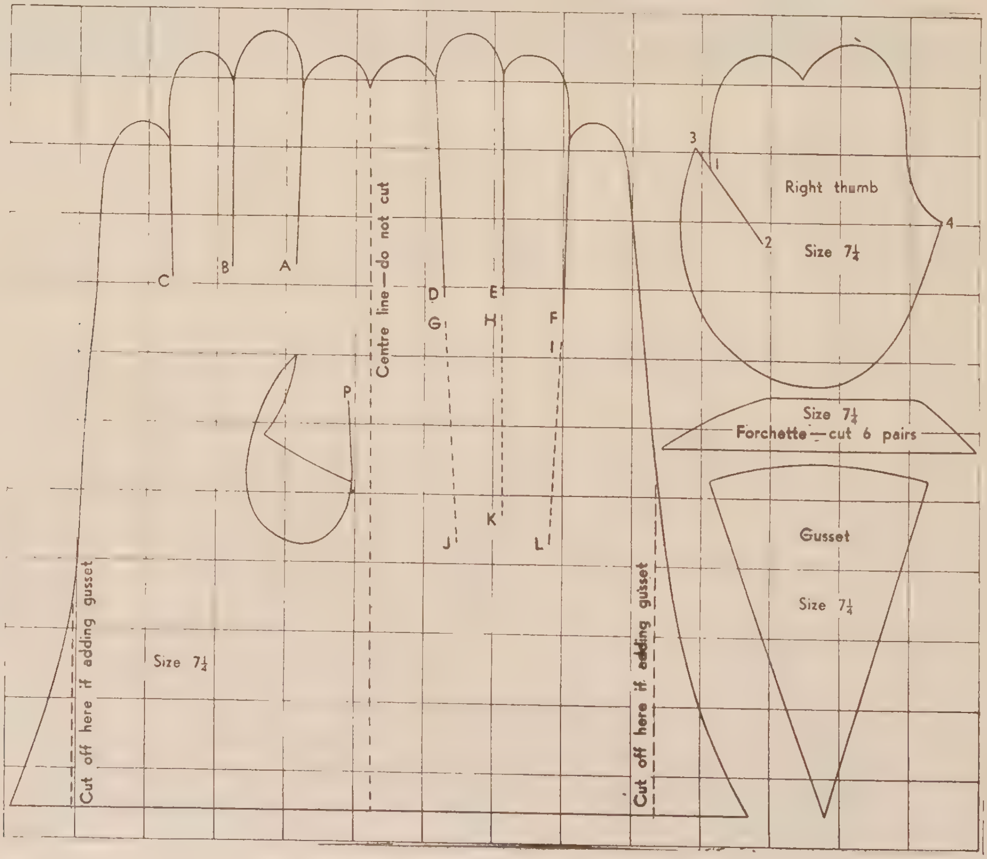
One of three special stitches may be used, and it is well to practise the stitch chosen on scraps of leather before beginning on the gloves, as the smartness of the final appearance of the gloves depends to a great degree on the sewing. Nevertheless, good sewing cannot disguise poor cutting or fitting.

A No. 5 or 6 between needle, that is, one shorter than normal, is best, and buttonhole twist or tightly twisted crochet cotton about the same thickness as the twist may be used for the thread, which may be matching or contrasting. Ordinary sewing silk is



PATTERN FOR SIZE 7 GLOVE

Each square = 1in.

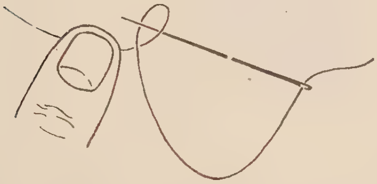


PATTERN FOR SIZE 7¼ GLOVE

Each square = 1in.

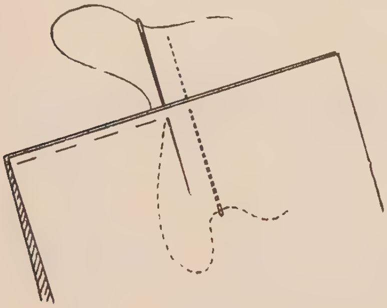
too fine and hard and cuts the leather. Threads should not be more than about 18in. long or they fray and the last stitches are not strong.

To practise, take two pieces of leather, with at least one straight edge each, and hold them wrong sides together with the straight edges matching. No knots are used, but the thread is anchored on the inside of the skin as follows: Holding the end under the left thumb near the place where the sewing is to be started, throw a small loop of thread and take a small stitch through part only of the thickness of the leather (not through to the right side) and bring the needle out through the loop so as to hold it, as shown in the diagram. (If the needle were put through the loop the other way, it would not hold it.) Pull the thread tight gently and firmly; do not jerk it or the leather may tear out. Bring the needle through to the right side of the leather at the starting point about 1/16in. from the edge.



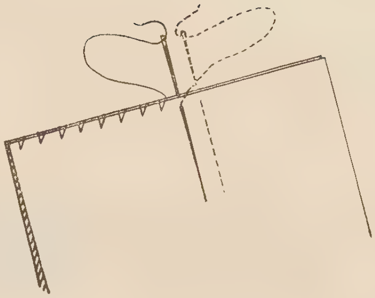
Anchoring the thread, instead of knotting it, on the inside of the leather when beginning to sew.

Stab stitch: Insert the needle at right angles to the leather a little more than 1/16in. from where it came out and push it straight through both thicknesses. Pull the thread firm and bring the needle back through the front of the work again at right angles, making a stitch between 1/16in. and 1/8in. long at the back. Continue with this back-and-forth motion, keeping stitches and spaces of equal length and always pushing the needle in at right angles. The row of stitches should be kept parallel to the edges of leather.



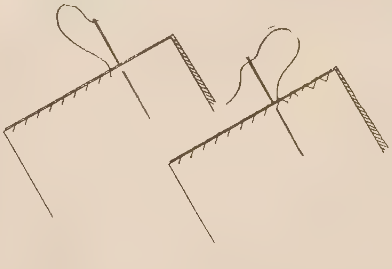
Stab stitch.

Streatly stitch: This is a form of overcasting, the needle being put twice through each hole before going on to the next stitch, always in the same direction, from the back of the work to the front, but again at right angles. It is very firm, but must be done evenly to present a good appearance. The stitches can be a little longer than in stab stitch—almost 1/8in.—and they should be taken a little closer to the edge. Because this stitch takes up less leather in the seam than stab stitch, the glove is larger, so when streatly stitch is being used it may be advisable to use a pattern a size smaller.



Streatly stitch.

Cross-stitch: This is double overcasting. Each seam is worked first forward and then backward, so that the second row of stitches makes crosses over the first. The same holes are used for the return row as were made in the first row. The stitches should be nearly 1/8in. long and, like the streatly stitch, close to the edge. Again, a smaller pattern may need to be used with this stitch.



Cross-stitch.

Both the streatly stitch and cross-stitch show up much more than the stab stitch and, if done with dark thread on light leather, may make the seams look somewhat heavy. Cross-stitch is particularly effective for the nips up the backs of the gloves, even though the rest of the gloves be sewn with stab stitch. With hard wear the stitches that pass over the edge of the leather may fray in time, especially at the tips of the fingers, but they are not hard to repair if matching thread is available. Stab stitch lasts longer, as the thread is protected from wear by the edge of the leather.

Sewing

When sufficient skill has been gained in the stitch chosen to enable it to be done easily and evenly, the sewing of the gloves may be started. The pieces may be sewn together in one of several possible orders, but the following has proved economical of time and effort and usually produces good results; the directions are given as for stab stitch:—

Pairing the Forchettes

Overcast the forchettes together in pairs along their bases, right sides together. It is easiest to begin at the blunt corners of the base and to sew along it to finish off at the pointed corner. If two slightly wider forchettes have been cut for the forefinger, each should be matched with an ordinary one to go up the side of the middle finger, where a wide forchette is not needed. Be sure a right and a left pair have been sewn up—that is, the wider forchette should be on the right of the other in one pair and on the left in the other. The extra width on the wide forchette should be eased in along the seam so that the bases of the two forchettes match.

Sewing the Nips

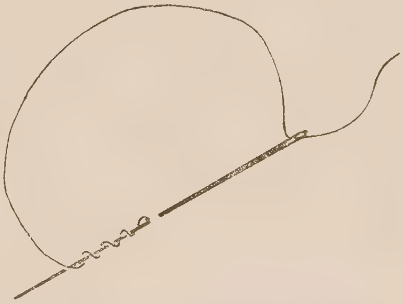
The nips on the backs of the hands are sewn as small tucks with plain or decorative stitchery. The standard arrangement for these nips is shown on the patterns, but they may be varied in a number of ways, though nearly always there are three to match the three spaces between the fingers. One variation is shown in the photograph at the head of this article.

Side Seam

Sewing up the side seam at this stage gives firmness to the glove and avoids too much stretching of the leather when the thumb is sewn in.

The seam should be started at the tip of the little finger and worked down to the cuff. The thread should be anchored on the wrong side of the leather on the palm side of the little finger and taken through to the right side of the leather one stitch length from the exact centre of the tip. It is then passed back through both the palm and the back finger pieces and the seam continued down to the cuff. At the cuff the thread should be finished off on the inside with a glovers' knot and the end run back up the seam a little way and cut off close.

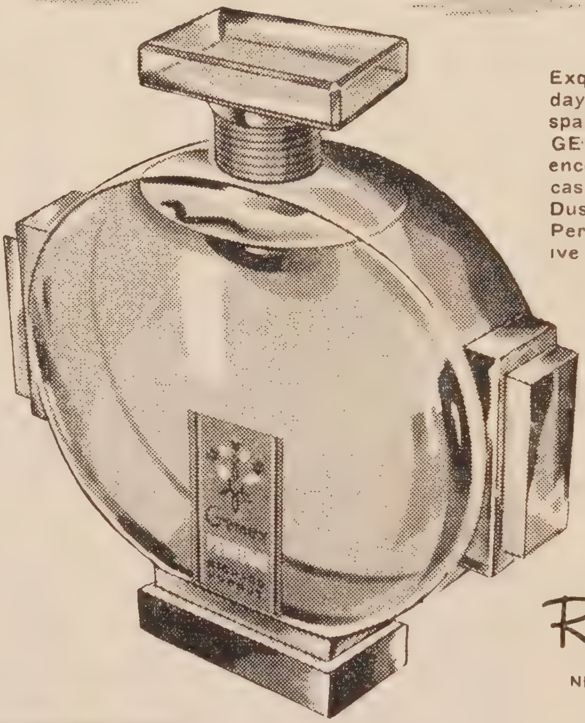
A gusset may be put in if desired. If no gusset is used, the glove is cut a little wider near the cuff. Lines are shown on the patterns for the correct shape with or without a gusset.



A glovers' knot for finishing off the end of a thread is made by taking a small stitch and twisting the thread round the point of the needle.

Gemey

PERFUME



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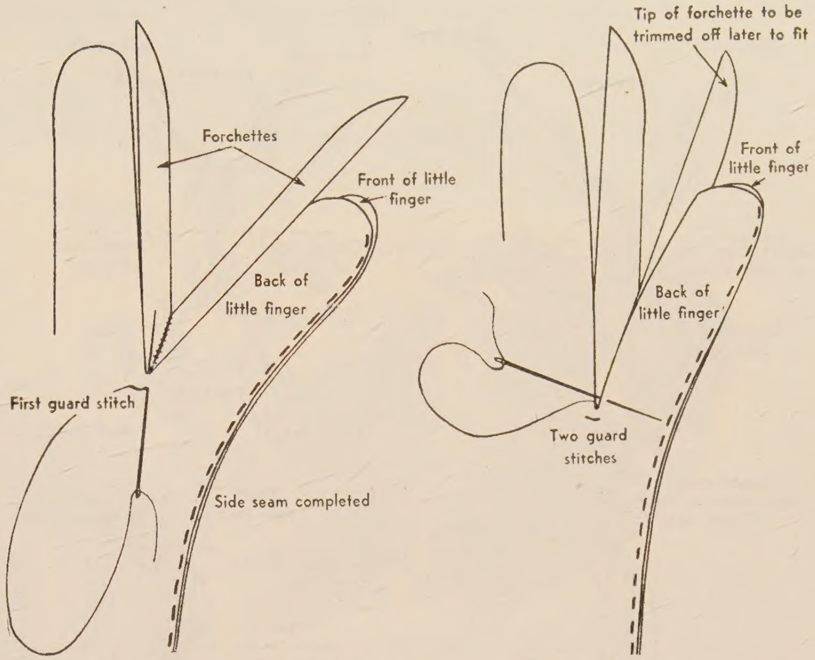
SEWING UP LEATHER GLOVES

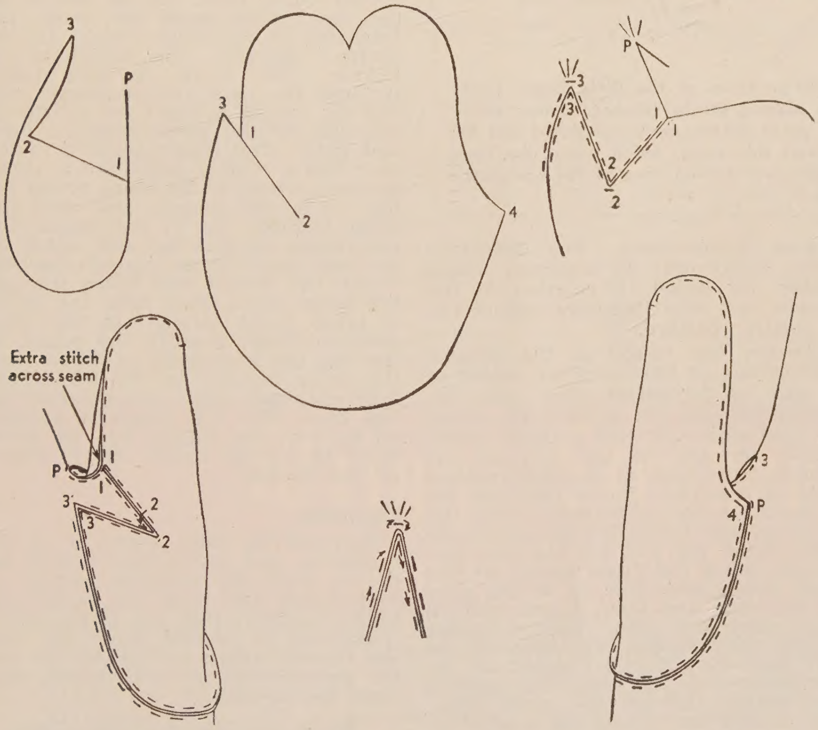


A back view of the sewing in of the forchettes. Left—The point of the oversewn forchette seam pulled in under the glove back at the base of the finger cut and held in place with a guard stitch. Right—The guard stitches completed and the seam between forchette and little finger begun.

The Thumb

The blunt corner of the thumb piece goes toward the back of the glove (4 matches P) and the pointed flap goes up the slit on the palm, the two sides of the cut from 1 to 2 going along the front and bottom edges of the thumb flap on the glove respectively. Any commercially made leather glove has this construction and, if difficulty is had with fitting the thumb, examining one may be helpful.

Choose the correct thumb for the glove being sewn and cut it from 1 to 2. If 1-2 on the thumb seems much longer than 1-2 on the glove, do not cut the thumb piece quite down to 2. Cut the glove vertically up to P (or P1 if the pattern has been altered). Anchor the thread on the wrong side of the thumb at 1 and bring it out at the blunt point made by the cut a seam width in from either edge. Sew the edge 1-2 along the bottom edge of the thumb flap from back to front of the hand. Arrange the stitches at 2 as shown in the diagram with one stitch from the point of the flap to the thumb piece, then across the end of the cut on the thumb, and then back into the same hole in the point of the flap. Continue from 2 to 3 from this point. At 3 arrange the stitches in a similar way, this time going from the point on the thumb to the hand, across the end of the slit on the palm, and back to the hole in the point of the thumb. This way of sewing round a point is worth mastering, as a very similar stitch is used for the tips of all the forchettes. Continue from 3 down the palm for a little over an inch, take the thread through to the wrong side, and cut it off leaving an end about 3in. long.

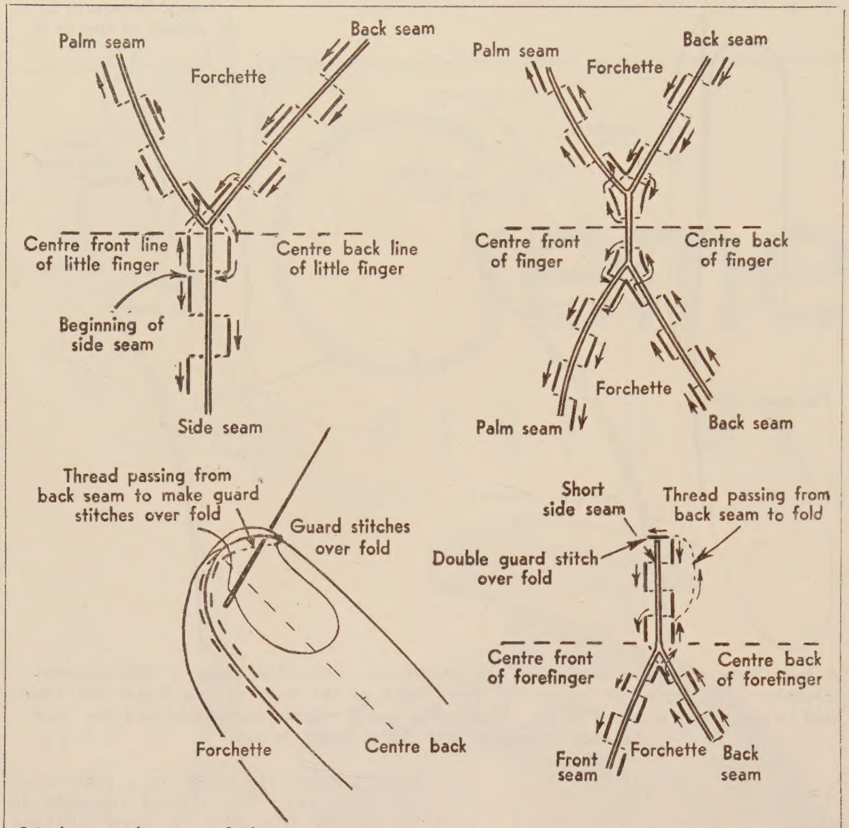


Sewing in the thumb. Upper left—The hole in the right-hand pattern into which the thumb piece must fit. Upper middle—The thumb piece. Upper right—Start at 1, sew to 2, round the point and back to 3, then an inch or two down the palm. Lower middle—Detail of the stitches round a point. Lower left and right—Front and back views of the finished thumb, showing the guard stitch round the fold at the tip. Sew from the tip, cross the seam at 1, then continue down to 4 (which fits into P) and round the palm.

Do not fasten off at this stage. Using a length of thread sufficient to complete the sewing of the thumb, anchor it again on the wrong side at the tip of the thumb and bring the needle through to the right side a seam width below and half a stitch length to one side of the base of the notch. Fold the thumb lengthwise down from the notch, so that the tips match, and put a double guard stitch over the fold. Then continue round the tip and down the thumb to 1, fitting a stitch right through the corner of the blunt point here into the same hole as was made by the first stitch at 1. If desired, an extra stitch may be taken over the seam between 1 on the thumb and 1 on the flap before continuing sewing the third side of the flap to the thumb. The blunt point 4 should fit exactly into the top of the slit at P and be stitched as were the points at 2 and 3, and the sewing should be continued down the straight side of the thumb hole until this begins to curve.

At this stage measure the thumb piece carefully round the curve of the hole, allowing plenty of ease, and if the thumb seems much too big, cut a small crescent-shaped piece out of the bottom of the hole; do not cut any leather off the thumb. Then continue sewing, easing the thumb into the hole by taking up a little more leather for each stitch on the thumb than on the edge of the hole. Leave the thread a little slack on this seam to allow for stretching as the glove is worn, when the wrinkles caused by the ease will disappear.

SEWING UP LEATHER GLOVES


Palm seam
Back seam
Forchette
Centre front line of little finger
Centre back line of little finger
Beginning of side seam
Side seam
Palm seam
Forchette
Back seam
Centre front of finger
Centre back of finger
Forchette
Palm seam
Back seam
Thread passing from back seam to make guard stitches over fold
Guard stitches over fold
Forchette
Centre back
Short side seam
Thread passing from back seam to fold
Double guard stitch over fold
Centre front of forefinger
Centre back of forefinger
Front seam
Forchette
Back seam

Stitches at the tips of the fingers. Upper—End-on views of the little finger (left) and middle or third finger (right) showing the placing of the stitches. Lower left—The forefinger tip, showing the back seam and guard stitches only completed and the needle in position for the first stitch of the short side seam, which brings the front of the finger round on to the back. Lower right—An end-on view of the completed forefinger.

Sew right up to where the first stitches finished, take the thread through to the wrong side from the opposite piece to that through which the first thread was taken, knot the two ends with a reef knot, run them in for a little way along the inside of the seam, and cut the thread off.

Fitting Forchettes

The forchettes are all sewn up the straight edge on the back of the hand and down the curved edge on the front of the hand. Before beginning to sew cut all the finger divisions carefully. Should the fingers be exceptionally slender or tapering, a very little may be shaved off both sides of each finger of the glove; the shavings should taper away to nothing at the base of the cut. Quite a lot more should be taken off each forchette, and taking it from only the curved side is simplest. It is best to take most from the forchettes rather than from the finger pieces of the glove, as making the shape of these finger pieces taper more than a very little spoils the smart appearance of the glove, but for very slender or tapering fingers it is satisfactory to take off a little as described. Of course most people with slender fingers will also have a narrow hand and can use a smaller glove pattern, lengthening the fingers if necessary. The directions given apply only to a person whose hands are broad in relation to the fingers and who therefore cannot use a smaller pattern.

Anchor the thread at the pointed end of one of the oversewn seams of a pair of forchettes, then pass the needle through the glove from wrong to right side at F, half a stitch length below the end of the cut and the width of the seam to one side (preferably on the third finger side, not the little finger side, of the cut). Pull the point of the forchettes up under the end of the cut and lay the two forchettes along the finger pieces so that their wrong sides face the wrong sides of the little and third fingers and all four edges are even. Take a double guard stitch across the base of the cut and through the points of the forchettes beneath, each time passing the needle through the same holes. The second time bring the needle out between the forchettes through the one next to the little finger only and sew this forchette to the little finger up to the tip. Calculate so that the last stitch goes from the forchette to the finger in the exact centre of the finger tip. Cut off the unwanted end of the forchette, reshaping the tip into a long curving point as before.

Take one stitch back toward the side seam, through back and palm sides of the finger only, then pass the needle back through the exact centre of the tip of the palm side and into the same hole in the tip of the forchette as was made by the last stitch. Continue sewing the curved edge of the forchette to the palm side of the little finger down to the base. Finish with a stitch from the glove to the forchette level with the base of the cut, and finish off the thread on the inside along the overcast seam of the forchettes.

Begin again at the back, anchoring the thread either to the glove or the forchette, and sew up the outside edge of the third finger along the straight edge of the second forchette. This time calculate so that the last stitch goes from the forchette to the finger 1½ stitch lengths from the centre. Trim off the tip of the forchette.

Take one stitch through back and palm of the finger only and then back through the palm side and into the last hole on the forchette again. Continue down to the base as before, but this time take a double guard stitch across the base of the cut through the glove and the ends of the forchettes beneath before finishing off the thread inside.

Sew in the next two pairs of forchettes in the same way. At the tip of the index finger the forchette should come right to the centre, so the last stitch must go from the forchette to the finger, right in the centre. Reshape the forchette as before. One stitch is then taken through the back of the finger only and the needle brought out a little to one side of the notch between back and palm. The finger piece is folded over and a double guard stitch taken across the base of the notch round the fold, as for the thumb. Sew back and palm together up to the finger tip, calculating so that the last stitch on the back again comes through the hole where the thread was taken through the back only. This time the stitch is taken right through to the palm side and then, through the centre of the tip, the first stitch is taken from the palm through to the tip of the forchette, once again straight into the last hole. The first finger is finished off as were the others, but the glove must be turned inside out to fasten off the thread.

Finishing

Trim off the little points of all the forchettes and any points round the thumb. Fold the forchettes inward up each finger and press the fronts and backs together. Pull the gloves gently lengthwise to smooth them out. Fold the thumbs across the palms and put the gloves away in tissue paper until they are needed.

When the occasion arises they may be taken out and worn with pride in their smart appearance and a justifiable sense of achievement. If they have been constructed with care and neatness, hand-made leather gloves are always smart and attractive.

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